

FLIGHT

First Aero Weekly in the World.

Founder and Editor : STANLEY SPOONER.

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

No. 406. (No. 40, Vol. VIII.)

OCTOBER 5, 1916.

[Weekly, Price 1d.
Post Free, 1½d.]

Flight.

Editorial Office : 44, ST. MARTIN'S LANE, LONDON, W.C.

Telegrams : Truditor, Westrand, London. Telephone : Gerrard 1828.

Annual Subscription Rates, Post Free.

United Kingdom .. 6s. 6d. Abroad .. 11s. 6d.

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EDITORIAL COMMENT.

HAS not the time now come when we should embark upon a severe policy of reprisal in answer to the continued German air raids on this country? Until now we have refrained from advocacy of raids in reprisal, because we have endeavoured to maintain a

feeling that even if we are fighting an enemy who has no elementary idea of the decencies of civilised war, there is no need for us to descend to his level. In our little wars of the past we have been accustomed to the mutilation of our wounded and the murder of those of our people unfortunate enough to fall into the hands of a savage enemy. We have bargained with the fact that civilians, men, women and children, would pay the last penalty if taken. But we have always refrained—and properly refrained—from reprisals in kind, recognising that we were fighting savage enemies whose code of war recognised no nice distinctions. They had generally never heard of Geneva and Hague Conventions, and understood nothing of the niceties of international law and the amenities of civilised war—if, indeed, any war can be called civilised.

Air Raids and Reprisals.

But the question most distinctly arises now, whether we are justified in continuing to fight Germany with the gloves on? Every week, and sometimes more than once in the week, our shores are raided by hostile aircraft, from which bombs are dropped on open and defended places alike, killing and wounding civilians, and among them a high proportion of women and children. We are not "squealing" about it. The German contention is that as a consequence of the aerial threat a large number of troops are kept in England and munitions which would otherwise be used in France have to be kept here. They claim also that the object of the raids is the destruction of munition factories and stores and the bombardment of fortified places. Well, supposing we allow all this and concede that they are carrying out a legitimate enterprise of war. It may be remarked, *inter alia*, that if their real object is to destroy places of military importance, it would help them to achieve that object with greater certainty if they would fly low enough to make sure that their bombs reach the real target and do not fall harmlessly—from the military point of view, that is—in residential thoroughfares. True, they would make better targets for our guns, and our aeroplanes would doubtless prefer to see them flying lower than they do. We are assured, however, by the German Press that the object of the raiders is not to get back safely, but to do the maximum amount of military damage. If they would come down to a thousand feet, say, they would make much better practice in their bomb-dropping. They would return to the Fatherland in even smaller proportion than they do now, but, according to their own story, that does not matter.

So far as producing any effect on the war is concerned, the raids leave the nation cold. They irritate, but nothing more. We don't like them—it would be folly to pretend we do—and would gladly see them cease for the sake of the poor women and little children who die and are mutilated in them. We are forced to the opinion that there is one way, and only one way, to bring about their cessation. That is by counter-raids on enemy towns. Such raids may quite justifiably be described as defensive, and the defence of these shores is as much a legitimate enterprise of war as the object sought to be attained by the enemy and which we have tentatively conceded

to him. The enemy might even be told that every raid on England will be countered by two on German towns, and that we intend to proceed on a policy of "no raid, no counter."

It is not for us to indicate how, when and where such counter-raids can be carried out. It is sufficient for the moment that we record the fact that "FLIGHT," which has hitherto pronounced against a policy of reprisal, has reluctantly come to the conclusion that the only way to cure a German is with his own medicine.

♦ ♦ ♦

Preparing for After the War.

Not the most optimistic among us can envisage the end of the war yet. Viewed from the most sanguine point of view, it looks as if it were safe to go on for at least another year, thus justifying the forecast of that great soldier and statesman, Lord Kitchener. True, something unforeseen may happen to put an early period to hostilities. There may be a revolution in Germany. Any one of half-a-dozen things may happen to accelerate the day of peace. But, on the other hand, the war may have to be fought out to the bitter end of a military decision. This is by far the most probable course for events to take. Whatever is to befall in either of the directions indicated no man can foresee. This, however, all men may be certain of, that the war must at some time or other come to an end and the period of reconstruction commence. And even more for the reason that we cannot tell how soon the time may come, or for how long it may be deferred, it behoves us to make preparation for the economic battle which is bound to be as bitter as the actual clash of arms.

The subject is one we see dealt with daily from almost every conceivable point of view. It is one upon which there are no two opinions. We are all agreed that we must prepare, and that in due season; but it is difficult to discern that up to now we have done much more than agree upon the point. Admittedly, the times are very difficult. People are so intent upon the first business in hand—that of winning the war—that it is hard to spare time and attention to problems that are not, as it were, of the moment. It has ever been a rather unfortunate characteristic of the nation that it is disposed to let to-morrow take care of itself. In no small measure it is that characteristic for which we are paying so heavy a price in blood and treasure now, and it is a characteristic which will have to go out of our lives, public and private, if the nation is to reap the full benefit of its sacrifices. We would go even farther than that, and say that it must disappear if we are not to meet a defeat in the fields of commerce that the enemy cannot inflict upon us in war.

All this being so, it is up to us as individuals and as a nation immediately to take active steps in the direction of preparation for the commercial war that is to come. Take the case of the aviation industry as one in point. The war has done immeasurable good to the trade, no matter from what point of view it is regarded. Design, both of machines and of engines, has progressed at a tremendous rate. Not only so, but from occupying quite a minor place two years ago, the aviation industry of this country has achieved the lead. British aeroplanes and British engines are in the van—and ought to remain there. But they will not unless we prepare to keep them there when

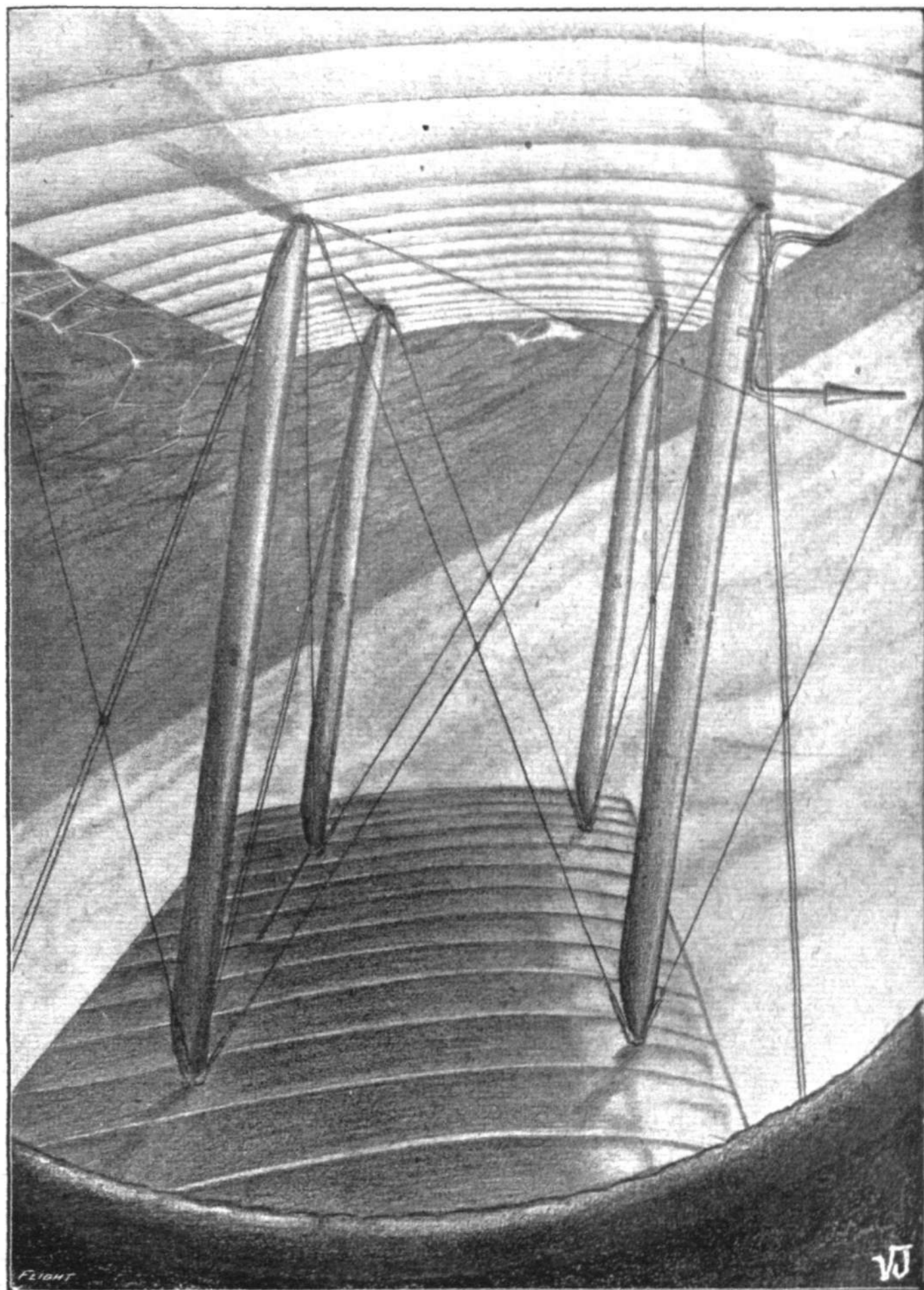
the demand created by the war has ceased and other outlets are necessary for the enormous production now achieved.

Naturally, one of the first questions arising is: What will be the fields open to be covered? Will not the cessation of the war demands mean a virtual closing down of the industry? Is there, in fact, a commercial future for aviation; a future so immediate, that is, as to warrant optimism on the part of those who are now of the industry?

These questions are so interwoven one with another that they can best be answered generally rather than specifically. *Imprimis*, the war has brought commercial aviation the nearer by several decades. Bear in mind the tens of thousands of miles that are flown every day, practically without accident. (Battle casualties are not accidents.) Also the wonderful duration flights that now and again emerge through the official reports. Remember, too, that not a tithe of the aerial activity on any of the Fronts comes to the knowledge of the man in the street, and then try to visualise the magnitude of the whole thing. Remember, also, that the censorship will not always exist, and that in the proper time all the mass of experience gained in war flying will be available to develop the more peaceful side of the movement. Even apart from this more peaceful side, there must be a general stocktaking and reorganisation of the world's military forces, since it is futile to think that this or any other war will be the last. Humanly speaking, so long as all law and order rests on an ultimate basis of force, so long will there be wars. Which is to say, as we had occasion to forcibly point out, that as long as human nature remains wars are not only possible but inevitable.

Aircraft are an indispensable adjunct of military power, so in that direction alone there will be great business to be done. The South American Republics, China, Spain, as well as our Allies, offer a field which will require covering in the face of strenuous opposition not only from Germany but from our friends as well, and unless we start soon and early we shall inevitably find that we have once again handicapped ourselves by leaving too much for the morrow. The Indian proverb that "To-morrow is also a day," has much of philosophic comfort in it, but it is of no good in modern business. Now is the time when we should be busy in the collection of figures and statistics relating to the overseas markets and their analysis with a view to after-the-war trade. We believe that in certain directions the Germans have gone even beyond this. Not only have the facts and figures been thoroughly digested, but they are actually booking orders for delivery after the war!

The British aviation industry has a very live representative body to look after its interests. We mean the Society of British Aircraft Constructors. It is to that body that we must look to initiate the preliminaries. We suggest the immediate formation of a committee by the Society, with the widest possible terms of reference, the business of that body to be the collection of all the available information relating to post-war possibilities, the results of its labours to be at the disposal of all individual members of the trade. But, in conclusion, it is up to everyone to do his share in the trade war when the time comes. It is of no avail that the best and most solid foundations be laid, if the labour to complete the structure is not forthcoming.



LOOPING WITH SMILES IN THE L. AND P. BIPLANE AT HENDON.—What a broadside view from a looping biplane looks like. As each loop is made the horizon line revolves round the centre of vision in a clockwise direction.

The British Air Service

"PER ARDUA AD ASTRA"

Under this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, it is not repeated in this column.

Royal Naval Air Service.

Admiralty, September 26th.

Chief Petty Officer L. F. Creese granted a temporary commission as Sub-Lieut. (R.N.V.R.), seniority Sept. 24th.

Admiralty, September 28th.

Flight-Lieut. G. F. Breese granted acting rank of Flight-Commander, Sept. 25th.

J. W. Eckford granted a temporary commission as Lieut. (R.N.V.R.), seniority Sept. 27th.

T. Terrell, A. W. Dow, H. W. Eades and Petty Officer J. D. Whitelaw granted temporary commissions as Sub-Lieuts. (R.N.V.R.), all seniority Sept. 27th.

E. F. Dixon, R. A. G. Hill and R. H. Catleugh entered as Proby. Flight Officers for temporary service, all date Oct. 1st.

Admiralty, September 29th.

J. H. Hagon, A. C. Baker and J. W. C. Dobbryn granted temporary commissions as Sub-Lieuts. (R.N.V.R.), and appointed to "President" for R.N.A.S., all date Sept. 28th.

Proby. Flight-Sub-Lieut. I. J. Springfield granted a temporary commission as Sub-Lieut. (R.N.V.R.) and appointed to the "President" for R.N.A.S., to date Sept. 28th. Appointment as Proby. Flight-Sub-Lieut. terminated Sept. 27th.

G. Goodhart, A. G. H. Brett, J. F. Nalder, J. E. L. Hunter, S. A. Bowyer and G. B. S. McBain, entered as probationary flight officers, temporary, and appointed to the "President," additional, for R.N.A.S., all date Oct. 1st.

Admiralty, October 2nd.

Flight-Commander C. M. Murphy granted acting rank of Squadron Commander, Sept. 28th.

Temp. Sub-Lieut. J. Weston appointed Temp. Acting Lieut. (R.N.V.R.), Sept. 28th.

Flight-Sub-Lieutenants.—R. Souray, C. V. Arnold, L. H. Wilkins, R. Young, R. M. Clifford, W. L. Graham, J. C. Croft, The Hon. N. G. H. Sturt, C. B. C. Swayne, A. H. Wann, T. W. Elmhirst, T. P. G. Moore, P. E. Maitland, P. G. M. Ommaney, W. Underhill, C. C. R. Edwards, I. C. Little, W. P. C. Chambers and C. W. C. Browne, promoted Flight-Lieuts., seniority Oct. 1st.

Acting Flight-Lieut. D. Gill promoted to Flight-Lieut., seniority Oct. 1st.

Acting Flight-Lieut. (Temp.) B. E. P. Gregg promoted Temp. Flight Lieut., seniority Oct. 1st.

C. W. Bailey, Sept. 1st; A. R. Knight, Aug. 26th; and D. M. Shields, Aug. 22nd, entered as Proby. Flight-Sub-Lieuts. for Temp. service.

Temp. Acting Flight-Lieut. C. O. Smith promoted Flight-Lieut. (Temp.), seniority Oct. 1st; also A. N. Gallehawk.

Flight-Sub-Lieutenants.—C. C. Carlisle, O. A. Butcher, H. E. Crawford, W. H. Sharpe, R. W. Lane, A. E. Hawker, I. H. W. Barnato, W. M. Tait, G. E. Hervey, M. R. Buckland, R. S. D. Q. Quincy, H. G. Travers, H. McClelland, L. A. T. Pritchard, G. A. Gooderham, S. J. Goble, G. Preen, W. R. Mackenzie, C. A. Rea, C. A. Eyre, F. S. McGill, F. E. Sandford, F. N. Halsted, N. Keeble, M. Bartlett, F. D. H. Bremner, A. A. Wallis and C. E. Jamieson promoted to Temp. Flight-Lieuts., seniority Oct. 1st.

Royal Flying Corps (Military Wing).

London Gazette Supplement, September 25th.

Wing Commander.—Capt. (Temporary Major) C. Bovill, R.A., from a Squadron Commander, and to be Temporary Lieutenant-Colonel whilst so employed; Sept. 9th, 1916.

Squadron Commanders.—From Flight-Commanders, and to be Temporary Majors whilst so employed:—Sept. 1st, 1916: Capt. H. Wyllie, Hamps. R. (T.F.); Capt. H. F. Glanville, W.I.R.; Capt. C. G. Bell, Special Reserve; Capt. P. E. L. Gethin, Special Reserve; Lieut. (Temporary Capt.) L. W. Learmount, Special Reserve; Lieut. (Temporary Capt.) B. C. McEwen, Special Reserve.

Flight-Commanders.—Capt. Lord E. A. Grosvenor, Special

Reserve; Aug. 28th, 1916. 2nd Lieut. H. G. Dean, York and Lanc. R., from a Flying Officer, and to be Temporary Captain whilst so employed; Aug. 30th, 1916.

Flying Officers.—2nd Lieut. (Temporary Lieut.) H. Hemming, Worc. R., from a Flying Officer (Observer), and to be seconded; Aug. 12th, 1916. (Substituted for the notification in the Gazette of Sept. 5th, 1916.) Aug. 23rd, 1916: Temporary 2nd Lieut. S. Nixon, General List; 2nd Lieut. C. C. Clark, R.A., and to be seconded; 2nd Lieut. R. H. S. Sloley, R.A., and to remain seconded; 2nd Lieut. C. C. Morley, Special Reserve. Aug. 30th, 1916: Lieut. C. S. J. Griffin, Gordon Highrs., and to be seconded; 2nd Lieut. (on probation) L. W. Waddell, Essex R., Special Reserve, and to be seconded; 2nd Lieut. T. E. Gorman, Special Reserve. Aug. 31st, 1916: Temporary Lieut. E. L. Williams, E. York R., from a Flying Officer (Observer), with seniority from March 4th, 1916; Temporary 2nd Lieut. A. P. Pycroft, Notts and Derby R., and to be transferred to the General List; 2nd Lieut. R. N. Carter, Dorset R., Special Reserve, and to be seconded; 2nd Lieut. E. C. Stringer, Lond. R. (T.F.) Temporary 2nd Lieut. E. H. Cambridge, General List; Sept. 1st, 1916. Lieut. G. A. Garveys-Gadd, R.F.A., Special Reserve, resigns his appointment on appointment as an Acting Adjutant, R.F.C.; June 22nd, 1916.

Experimental Officer (graded as an Equipment Officer).—Capt. I. O. Griffith, Special Reserve, from an Assistant Equipment Officer; Sept. 1st, 1916.

Assistant Experimental Officer (graded as an Assistant Equipment Officer).—2nd Lieut. (on probation) W. V. Bevon, Special Reserve; Aug. 31st, 1916.

Assistant Equipment Officers.—Sept. 4th, 1916: Temporary 2nd Lieut. W. L. Joseph, attd. Worc. R., and to be transferred to the General List; 2nd Lieut. (on probation) W. E. M. Walker, Special Reserve; Temporary 2nd Lieut. H. L. Woolveridge, General List; Temporary 2nd Lieut. F. W. Ham, General List; 2nd Lieutenants (on probation), Special Reserve: H. W. Sidley, H. S. Counsell, S. P. Stocks; 2nd Lieut. A. S. Cox, Special Reserve; 2nd Lieutenants (on probation), Special Reserve: H. J. Barwick, M. A. Chappell, W. T. Curtis, H. B. Golding, F. E. Hobley, F. M. Howard, J. J. Lovesay; Temporary 2nd Lieut. R. F. McMichael, General List; 2nd Lieutenants (on probation), Special Reserve: E. A. Molyneux, H. W. Robinson, D. Smith, G. H. Warneken, H. G. Welsford and C. H. Butcher.

Supplementary to Regular Corps.—The under-mentioned 2nd Lieutenants (on probation) are confirmed in their rank: A. S. Cox, A. G. Jarvis, J. H. Robertson, G. B. Wilkins. The under-mentioned to be 2nd Lieutenants (on probation): W. Birtwistle; Aug. 14th, 1916. E. E. Cutts; Aug. 26th, 1916. P. V. Baines; Sept. 25th, 1916.

London Gazette, September 26th.

Temporary appointment made at the War Office:—

Staff Captain.—Temp. 2nd Lieut. (Temp. Capt.) M. K. Cooper-King, Gen. List, from a Flight-Commander, R.F.C., and to retain his temporary rank whilst so employed; Aug. 12th, 1916.

Flight-Commanders.—Lieut. P. B. Prothero, Arg. and Suth'd Highrs., Spec. Res., from a Flying Officer, and to be Temp. Capt. whilst so employed; Sept. 3rd, 1916. Sept. 12th, 1916: Temp. Capt. N. J. A. L. Prinsep, Gen. List, from a Balloon Officer. From Flying Officers, and to be Temp. Capt. whilst so employed: Temp. Lieut. V. Busby, R.E., Spec. Res.; Lieut. L. T. N. Gould, R.A.; Sept. 14th, 1916.

Flying Officers.—Lieut. G. Alchin, R.F.A., Spec. Res., from a Flying Officer (Ob.); Aug. 29th, 1916, but with seniority from Nov. 22nd, 1915. Aug. 31st, 1916: Lieut. W. S. Scott, Lanc. Fus. (T.F.); 2nd Lieut. F. Hall, Dorset R., and to be second. Sept. 1st, 1916: Capt. G. C. Pirie, Sco. Rif., Spec. Res., from a Flying Officer (Ob.), with seniority from May 4th, 1916. 2nd Lieut. J. Seabrook, Spec. Res.; Temp. 2nd Lieut. N. L. Robertson, Gen. List, from a Flying Officer (Ob.);

Sept. 2nd, 1916, but with seniority from Feb. 15th, 1916. Sept. 5th, 1916: 2nd Lieut. (on prob.) F. St. J. F. N. Echlin, R. Fus., Spec. Res., from an Assistant Equipment Officer; 2nd Lieut. W. E. Reed, Durh. Fort. Engrs., R.E. (T.F.); Temp. 2nd Lieut. H. D. Addis, Gen. List; Lieut. P. B. Tabernacle, Princess Patricia's Can. L.I.; Sept. 5th, 1916. 2nd Lieut. F. L. Harding, Som. L.I., and to be sec'd.; Sept. 7th, 1916. 2nd Lieut. (on prob.) B. K. O. Mathews, 3rd North'n. R., Spec. Res., and to be sec'd.; Sept. 8th, 1916.

Flying Officer (Observer).—The rank of Capt. W. A. Fleming, Devon R., is as now described, and not as in the *Gazette* of Sept. 22nd, 1916.

Assistant Equipment Officers.—2nd Lieut. L. S. Newns, Spec. Res.; May 15th, 1916. 2nd Lieut. G. T. Beer, Devon R. (T.F.); Sept. 4th, 1916.

Memoranda.—To be 2nd Lieuts. for duty with R.F.C.: Sapper C. V. Thornton, from Lond. Elec. Engrs. (T.F.); July 19th, 1916. Pte. S. T. Fradd, from Devon R. (T.F.); Aug. 21st, 1916. Petty Officer D. Armitage, from R.N.A.S.; Sept. 10th, 1916. Temp. Capt. J. S. Curtis, from R. Mar.; Sept. 11th, 1916.

Acting Sergt. A. Wragg, from R.F.C., to be Temp. 2nd Lieut. for duty with the Military Wing of that Corps; Sept. 14th, 1916.

Supplementary to Regular Corps.—2nd Lieuts. (on prob.) confirmed in their rank: M. A. Seymour, J. F. A. Day, W. H. Trinder, G. D. Rae, L. S. Newns, H. W. Sidley, A. J. Winstanley, P. S. Butterworth, S. P. Stocks, D. S. Evans, H. S. Counsell, G. H. Jacob, J. W. Baillie, W. V. Bevon, F. C. Deane, C. H. Bell, A. B. Drewery, P. G. Robinson, R. M. Niell, A. O. K. Wright, J. Seabrook, and G. Barrett. The under-mentioned to be 2nd Lieuts. (on prob.):—Aug. 21st, 1916: G. E. Osmond, M. F. A. Paine, E. F. Cameron, R. W. Mitchell, R. T. Royse, D. B. Thorp, C. R. Fleming-Williams,

E. M. A. Van-der-Meersch, W. G. Cooke, T. T. Cumming, H. Whitehead, J. Wheatland-Clinch, J. Goodenough, C. J. W. Hosken, A. W. McAuslane, F. O. Gibbon, J. J. Bartlett, R. E. Chadderton, E. C. McKenzie-Martyn, H. Tallis, H. N. Stradling, R. R. Richards, P. H. S. Gwilliam. M. R. Grover; Aug. 22nd, 1916. G. T. Bridgewater; Sept. 22nd, 1916.

London Gazette Supplement, September 27th.

Flight-Commanders.—From Flying Officers, and to be Temp. Capt. whilst so employed:—Aug. 1st, 1916: Temp. 2nd Lieut. H. C. Wakefield, Gen. List; 2nd Lieut. H. R. Hawkins, Spec. Res. Capt. C. G. Burge, York and Lanc. R., from a Flying Officer; Sept. 1st, 1916. From Flying Officers, and to be Temp. Capt. whilst so employed:—Sept. 1st, 1916: Lieut. W. W. Higgin, L'pool. R. (T.F.); Lieut. S. T. L. Greer, Lond. Brig., R.F.A. (T.F.); Lieut. C. A. Brooks, Wilts. R., Spec. Res.; Temp. Lieut. G. J. Jones, Gen. List; 2nd Lieut. (Temp. Lieut.) W. Astell, 1st Lovat's Scouts Yeo. (T.F.); 2nd Lieut. O. A. Westendarp, Lond. R. (T.F.); 2nd Lieut. A. C. Wilson, 12th Lrs.; Temp. 2nd Lieut. H. Barker, Gen. List; 2nd Lieut. D. Gilley, Devon. R.; 2nd Lieut. (on prob.) J. O. Archer, R.F.A., Spec. Res.; 2nd Lieut. C. S. Ross, Spec. Res.; Temp. 2nd Lieut. R. J. Lillywhite, Gen. List; 2nd Lieut. W. S. R. Bloomfield, Spec. Res.; Temp. 2nd Lieut. F. M. Ballard, Gen. List. Temp. 2nd Lieut. (Temp. Lieut.) G. A. N. Mitchell, R. Fus., from a Balloon Officer, and to be Temp. Capt. whilst so employed; Sept. 4th, 1916. 2nd Lieut. D. H. Dabbs, Berks Yeo. (T.F.), from a Flying Officer, and to be Temp. Capt. whilst so employed; Sept. 10th, 1916.

Equipment Officer.—2nd Lieut. G. W. A. Brown, Spec. Res., from an Assistant Equipment Officer, and to be Temp. Capt. whilst so employed; Aug. 19th, 1916.

Flying Officers.—Aug. 28th, 1916: Temp. 2nd Lieut. G. W. Howland, R. Ir. Rif., and to be transd. to the Gen.



A scene where the Zeppelin raider fell in Essex, showing crowds watching an aeroplane flying over the wrecked airship.

List; 2nd Lieut. G. D. Rae, Spec. Res.; 2nd Lieut. A. J. Winstanley, Spec. Res. Aug. 31st, 1916: 2nd Lieut. D. M. Bisset, Gord. Highrs. (T.F.); 2nd Lieut. M. A. Seymour, Spec. Res.; Temp. 2nd Lieut. C. G. Baker, Gen. List; 2nd Lieut. G. H. Jacob, Spec. Res.; 2nd Lieut. J. W. Baillie, Spec. Res.; 2nd Lieut. P. S. Butterworth, Spec. Res.; 2nd Lieut. D. S. Evans, Spec. Res. Temp. 2nd Lieut. (on prob.) G. F. Campbell, High. L.I., and to be transfd. to the Gen. List; Sept. 1st, 1916. Lieut. A. D. Whitehead, R. War. R., and to be sec'd.; Sept. 2nd, 1916.

Flying Officer (Observer).—Temp. 2nd Lieut. J. B. Hinchcliff, 10th Yorks. L.I., and to be transfd. to the Gen. List; June 12th, 1916. The appointment of Temp. 2nd Lieut. J. A. Hinchcliff, Yorks. L.I., as a Flying Officer (Ob.), notified in the *Gazette* on July 7th, 1916, is cancelled. Aug. 30th, 1916: Temp. Capt. G. Dixon-Spain, R. Fus., and to be transfd. to the Gen. List; Lieut. R. H. Martin, 18th Can. Inf. Bn.; 2nd Lieut. H. J. Hamilton, D. of Corn. L.I., and to be sec'd.

Balloon Officers.—Aug. 12th, 1916: 2nd Lieuts., Spec. Res.: E. G. Boulenger, and L. S. S. Northcote.

Assistant Equipment Officers.—2nd Lieuts., Spec. Res.: T. Morrison; July 5th, 1916. Aug. 31st, 1916: H. H. W. Vowden, H. E. L. Pilbrow, G. A. Lawlor, E. G. Herbert and L. Stones.

Memoranda.—The under-mentioned to be Temp. 2nd Lieuts. for duty with R.F.C.:—21st Aug., 1916: 1st Cl. Air-Mech. G. W. Charley, from R.N.A.S.; Cadet J. M. Mitchell, from 2nd Artists' Rif. O.T.C.; 2nd Cl. Air-Mech. H. Nankivell, from R.F.C., to be Temp. 2nd Lieut. for duty with the Military Wing of that Corps; Sept. 13th, 1916.

London Gazette Supplement, September 28th.

The under-mentioned Warrant and N.C.Os. to be 2nd Lieuts. for service in the Field:—

For duty with R.F.C.: Sergt. C. E. Morgan, from R.F.C.; July 12th, 1916. Pte. J. T. Gibbon, from A.S.C.; Aug. 15th, 1916. Aug. 17th, 1916: Sergt. G. Lacey, from R.F.C.; L.-Sergt. E. M. Henderson, from Lond. R. (T.F.); Corpl. J. H. A. Byrne, from R.F.C.; 2nd Cl. Air-Mech. C. W. O'Neill-Ready, from R.F.C. 1st Cl. Air-Mech. S. Mercer, from R.F.C.; Aug. 21st, 1916. Sergt. J. E. Macloghlin, from R.F.C.; Aug. 22nd, 1916. Pte. F. G. Thierry, from Lond. R. (T.F.); Aug. 25th, 1916. Sergt. P. C. Hollingsworth, from H.A.C. (T.F.); Aug. 26th, 1916. Flight-Sergt. B. E. Hobbs, from R.F.C.; Aug. 27th, 1916. Aug. 28th, 1916: Armr.-Sergt. A. E. Godfrey, 1st Can. Pioneer Bn.; Pte. C. H. P. Ewbank, from Lond. R. (T.F.); Sapper W. T. Jourdan, from 2nd Can. Tunnelling Co.; Aug. 29th, 1916.

Squadron Commander.—Lieut. (Temp. Capt.) J. A. Cunningham, R.A., from a Flight-Commander, and to be Temp. Major whilst so employed; Sept. 1st, 1916.

Flight-Commanders.—From Flying Officers, and to be Temp. Capt. whilst so employed: Lieut. E. W. Farrow, Mach. Gun. Serv., Can. Local Forces; Sept. 15th, 1916. Temp. 2nd Lieut. E. T. Farrow, Gen. List; Sept. 18th, 1916. Temp. Lieut. G. B. Hodgson, Gen. List; Sept. 19th, 1916.

Flying Officers.—Aug. 23rd, 1916: 2nd Lieut. E. L. French, R. Ir. Rif., Spec. Res., and to be sec'd.; 2nd Lieut. O. Nixon, Essex R., and to be sec'd.; Temp. 2nd Lieut. A. F. Organ, Gen. List, from a Flying Officer (Ob.), with seniority from April 29th, 1916; 2nd Lieut. F. C. Deane, Spec. Res.; Temp. 2nd Lieut. W. Cochrane, Gen. List; Temp. 2nd Lieut. F. B. Luget, Gen. List; 2nd Lieut. R. M. Neill, Spec. Res.; 2nd Lieut. C. H. Bell, Spec. Res. Temp. 2nd Lieut. I. E. M. Mackenzie, Gen. List; Aug. 27th, 1916. Lieut. W. R. Gayner, 17th Can. Inf. Bn.; Aug. 28th, 1916. Lieut. R. S. Brown, Australian F.C.; Aug. 29th, 1916. 2nd Lieut. G. S. Bozman, R. W. Surr. R. (T.F.); Aug. 30th, 1916. Sept. 1st, 1916: 2nd Lieut. A. P. Davidson, High. L.I., and to be sec'd.; 2nd Lieut. D. R. C. Gabell, Glouc. R., and to be sec'd.; Sept. 3rd, 1916: 2nd Lieut. (Temp. Capt.) A. G. Saxty, Som. L.I. (T.F.); 2nd Lieut. (Temp. Lieut.) J. M. J. Spencer, Northd. Fus. (T.F.). Temp. Lieut. J. B. Lawton, E. Kent R., and to be transfd. to General List; Sept. 5th, 1916. Sept. 9th, 1916: Temp. Lieut. W. G. B. McKechnie, Gen. List, from a Flying Officer (Ob.), with seniority from April 29th, 1916: Lieut. S. H. Starey, Shrops. L.I., Spec. Res., and to be sec'd.; Temp. 2nd Lieut. B. W. Hill, Rif. Brig., and to be transfd. to Gen. List; Temp. 2nd Lieut. (Temp. Lieut.) I. G. Davies, Gen. List, from a Flying Officer (Ob.), with seniority from Feb. 1st, 1916: Temp. 2nd Lieut. A. J. Court,

Gen. List; Temp. 2nd Lieut. S. N. Williams, Gen. List; 2nd Lieut. E. J. Roberts, Spec. Res.

Balloon Officers.—Aug. 28th, 1916: Capt. V. O. Todd, R. Lanc. R., and to be sec'd.; Temp. 2nd Lieut. O. Williams, High. L.I., and to be transfd. to Gen. List; Temp. 2nd Lieut. S. C. Shepherdson, Welsh R., and to be transfd. to Gen. List; 2nd Lieut. A. J. Johnston, Spec. Res.; 2nd Lieut. C. J. R. Milton, Spec. Res.; 2nd Lieut. C. McM. Russell, Spec. Res. Sept. 11th, 1916: Capt. W. J. Alexander, Devon R.; 2nd Lieut. (Temp. Lieut.) A. Law, Arg. and Suth'd. Highrs. (T.F.); Temp. Lieut. (2nd Lieut., Welsh Brig., R.F.A. (T.F.)) R. H. N. Lomax, Mach. Gun. Corps, and to be transfd. to General List; Temp. 2nd Lieut. W. A. Dunn, Arg. and Suthd. Highrs., and to be transfd. to Gen. List; Temp. 2nd Lieut. K. C. Campbell, Bord. R., and to be transfd. to Gen. List; 2nd Lieut. (on prob.) F. B. B. Shand, Spec. Res.

Adjutants.—Lieut. (Temp. Capt.) B. H. Bonham-Carter, 40th Pathans, Ind. Army; Sept. 1st, 1916. Capt. H. C. C. Morley, E. Kent R., and to be sec'd., vice Capt. J. A. M. Lang, Notts and Derby R.; Aug. 27th, 1916.

Brigade Commander and to be Temporary Brigadier-General while so employed.—Brevet Major C. A. H. Longcroft, Welsh R., from Temp. Lieut.-Col. and Wing Commander, R.F.C.; Aug. 28th, 1916.

Staff Captains.—Aug. 27th, 1916: Capt. J. A. M. Lang, Notts and Derby R., from Adjutant, R.F.C.; Lieut. (Temp. Capt.) R. H. Jerman, R.W. Fus., from Adjutant, R.F.C., and to retain his temporary rank whilst so employed, vice Capt. H. N. Walker, Welsh R.

Memoranda.—The under-mentioned to be Temp. Lieuts.:—Sept. 29th, 1916: 2nd Lieut. W. G. Stewart, R.F.C., Spec. Res., from a Flying Officer; Sergt. J. W. Matthews, from a Divisional Sig. Co., R.E.; Cadet W. J. King, from Cadet School O.T.C., M.T., A.S.C., to be Temp. 2nd Lieut. for duty with R.F.C.; Sept. 6th, 1916.

Supplementary to Regular Corps.—The under-mentioned 2nd Lieuts. (on prob.) are confirmed in their rank: E. J. Roberts, C. McM. Russell, C. J. R. Milton, A. J. Johnston, G. L. Bond, H. F. Chapman, R. S. Jameson. The under-mentioned to be 2nd Lieuts.: R. J. Cowan; July 9th, 1916. Aug. 14th, 1916: R. A. Hassard, C. H. Boyle. The under-mentioned to be 2nd Lieuts. (on probation): P. R. Hutchinson; Aug. 19th, 1916. A. C. Smith; Aug. 21st, 1916.

London Gazette Supplement, October 2nd.

Flight Commanders.—And to be Temp. Capt. whilst so employed:—Sept. 15th, 1916: Temp. Lieut. J. B. Quested, Gen. List, from a Flying Officer; 2nd Lieut. (on prob.) B. H. Sisson, R.G.A., Spec. Res., from a Balloon Officer; 2nd Lieut. A. M. Vaucour, R.A., from a Flying Officer. 2nd Lieut. (Temp. Lieut.) T. L. Purdom, K.O.Sco. Bord. (T.F.), from a Flying Officer; Sept. 20th, 1916.

Flying Officers.—Lieut. (now Capt.) R. B. Bourdillon, Spec. Res., from an Assistant Equipment Officer, from May 15th to June 8th, 1916. Temp. Lieut. F. O. Troup, R. Innis. Fus., and to be transfd. to Gen. List; Aug. 29th, 1916. Sept. 7th, 1916: 2nd Lieut. (Temp. Capt.) A. G. Deuchar, Northern Cyclist Bn. (T.F.); Lieut. E. M. Lugard, R. Lanc. R., and to be sec'd.; Lieut. A. Ferris, R. Ir. Rif., Spec. Res., and to be sec'd.; Temp. 2nd Lieut. (on prob.) G. D. Buckeridge, K.R. Rif. C., and to be transfd. to Gen. List. Sept. 8th, 1916: Temp. 2nd Lieut. M. A. E. Cremetti, R. Sc. Fus., and to be transfd. to Gen. List; 2nd Lieut. G. W. Gillespie, Middx. R. (T.F.); 2nd Lieut. H. F. Evans, Berks. R. Horse Art. (T.F.). Sept. 9th, 1916: 2nd Lieut. D. W. Forshaw, Brecknockshire Bn., S. Wales Bord. (T.F.); 2nd Lieut. J. W. D. Leigh, Northern Cyclist Bn. (T.F.); 2nd Lieut. F. G. Parsons, Spec. Res. Temp. Lieut. A. Duguid, Gen. List, from a Flying Officer (Ob.); Sept. 10th, 1916, but with seniority as from Feb. 17th, 1916.

Balloon Officers.—Aug. 28th, 1916: Temp. Capt. B. White, High. L.I., and to be transfd. to Gen. List; 2nd Lieut. (Temp. Capt.) W. Wallace, Northumbrian Brig., R.F.A. (T.F.); Temp. Lieut. L. D. A. Dircks, Lond. R. (T.F.); Temp. Lieut. R. M. Plummer, Bedf. R. (T.F.); Temp. Lieut. R. P. Sewell, Essex R., and to be transfd. to Gen. List; Lieut. N. R. Mossop, Suff. R., Spec. Res., and to be sec'd.; Temp. 2nd Lieut. F. S. Wallis, R. War. R., and to be transfd. to Gen. List; 2nd Lieut. (on prob.) D. P. Farrant, R. Fus., Spec. Res., and to be sec'd.; 2nd Lieut. G. L. Bond, Spec. Res.; Temp. 2nd Lieut. P. J. Scales, Hamps. R., and to be transfd. to Gen. List; 2nd Lieut. H. F. Chapman, Spec. Res.; 2nd Lieut. R. S. Jameson, Spec. Res.

Adjutants.—Capt. G. B. Fraser, 2nd Regt. King Edward's Horse, Spec. Res., and to be sec'd.; Aug. 12th, 1916. Temp. 2nd Lieut. (Temp. Lieut.) G. R. Moser, Arg. and Suthd. Highrs., from a Flying Officer (Ob.); Sept. 18th, 1916.

Assistant Equipment Officers.—2nd Lieut. H. I. Bell, 3rd Co. of Lond. Yeo. (T.F.); Aug. 25th, 1916. Temp. 2nd Lieut. P. M. H. Currie, Gen. List; Sept. 1st, 1916. 2nd Lieut. (on prob.) G. L. Main, Spec. Res.; Sept. 9th, 1916. Sept. 10th, 1916: 2nd Lieut. (Temp. Capt.) W. T. Taylor, 12th N. Lan. R. (T.F.); Temp. 2nd Lieut. A. D. Goodwin, Gen. List. Sept. 11th, 1916: Temp. 2nd Lieut. H. J. Brambley, Worc. R., and to be transfd. to Gen. List; Temp. 2nd Lieut. (on prob.) L. C. Atwood, Rif. Brig., and to be transfd. to Gen. List; Temp. 2nd Lieut. P. P. Capelli, Gen. List; 2nd Lieut. (on prob.) C. W. Barnsley, Spec. Res.; 2nd Lieut. (on prob.) J. J. Bartlett, Spec. Res.; 2nd Lieut. (on prob.) R. E. Chadderton, Spec. Res.; Temp. 2nd Lieut. G. W. Charley, Gen. List; 2nd Lieut. (on prob.) R. W.

Mitchell, Spec. Res.; Temp. 2nd Lieut. F. A. Cobb, R.A., and to be transfd. to General List; 2nd Lieuts. (on prob.), Spec. Res.: D. L. Hollis, W. G. Cooke, C. R. Fleming-Williams, F. O. Gibbon, J. Goodenough, M. R. Grover, P. H. S. Gwilliam, C. J. W. Hosken, A. W. McAuslane, H. Whitehead; Temp. 2nd Lieut. A. B. Wiggins, Gen. List; 2nd Lieuts. (on prob.), Spec. Res.: T. A. B. Rolfe, E. C. McKenzie-Martyn; Temp. 2nd Lieut. J. M. Mitchell, Gen. List; 2nd Lieuts. (on prob.), Spec. Res.: G. E. Osmond, M. F. A. Paine, R. R. Richards, R. T. Royse, A. C. Smith, H. N. Stradling, H. Tallis, D. B. Thorp, E. M. A. Van der Meersch, J. Wheatland-Clinch, A. E. Squire. * * *

Memorandum.—Lieut. A. B. Wiggins, from a Cadet Bn., R. War. R., to be Temp. 2nd Lieut. for duty with R.F.C.; Aug. 21st, 1916.

Supplementary to Regular Corps.—The under-mentioned resign their commissions: Lieut. (Temp. Capt.) W. H. Furlonger, 2nd Lieut. (on prob.) A. Brown, 2nd Lieut. A. Goulding (on account of ill-health), all Oct. 3rd, 1916.

THE ROLL OF HONOUR.

Reported by the Admiralty:—

Accidentally Killed.

Proby. Flight-Sub-Lieut. P. S. Kennedy, R.N.
Flight-Sub-Lieut. J. D. Scott, R.N.

Previously reported Missing, now reported Killed.

Acting Flight-Com. G. H. Beard, D.S.C., R.N.

Died of Injuries.

2nd Grade Air Craftsman O. B. Langford.

Injured.

Flight-Lieut. Norman W. G. Blackburn, R.N.
Proby. Flight-Sub-Lieut. E. L. Lister, R.N.
Lieut. R. G. St. John, R.N.V.R.

Accidentally Injured.

Proby. Flight-Sub-Lieut. R. A. Campbell, R.N.

Slightly Injured.

Flight-Lieut. E. Cadbury, R.N.
Proby. Flight Sub-Lieut. S. E. G. Lees, R.N.

Slightly Wounded.

P.O. Mech. J. J. McGladrigian, Armoured Car Div., R.N.A.S.
P.O. Mech. A. Rodwell, Armoured Car Div., R.N.A.S.

Reported by the War Office:—

Killed.

Lieut. C. W. Hardman, Middlesex, attd. R.F.C.
Second Lieut. C. D. Higgins, R.F.C.
Second Lieut. L. V. Morgan, Buffs. (E. Kent) and R.F.C.
Second Lieut. P. S. Osmaston, R. Sussex, attd. R.F.C.
8864 2nd Air Mech. R. Anderson, R.F.C.

Died of Wounds.

Lieut. G. G. Bentley, R.F.C.
Second Lieut. F. Hall, Dorset, attd. R.F.C.
Second Lieut. P. J. Smyth, Connaught Ran., attd. R.F.C.

Wounded.

Second Lieut. C. Baines, York and Lanc., attd. R.F.C.
Lieut. J. A. R. Buller, R.F.C.
Second Lieut. A. J. Cathie, R.F.C.
Second Lieut. L. F. Forbes, R.F.C.
Second Lieut. A. R. Walker, Seaforth H., attd. R.F.C.
4258 1st Air Mech. H. W. Woodcock, R.F.C.

Missing.

Second Lieut. R. N. Carter, Dorset R., attd. R.F.C.
Second Lieut. G. Edwards, R.F.C.
Second Lieut. R. H. Edwards, R.F.C.
Second Lieut. O. O. Godfrey, R.F.C.
Second Lieut. W. J. Gray, R.F.C.
Second Lieut. G. Hedderwick, Dragoon Gds., attd. R.F.C.
Second Lieut. R. D. Herman, S. Lancs. and R.F.C.
Second Lieut. F. A. A. Hewson, Border, attd. R.F.C.
Second Lieut. K. F. Hunt, Yeomanry and R.F.C.
Lieut. J. M. J. Kenny, A.S.C. and R.F.C.
Second Lieut. E. J. Roberts, R.F.C.
Second Lieut. J. L. Tibbetts, R.F.C.
Captain H. C. Tower, R.F.C.
Lieut. W. G. Warn, R. Sussex and R.F.C.
Second Lieut. T. West, R.E. and R.F.C.
Second Lieut. E. H. Wingfield, R.F.C.
1565 Flight-Sergt. N. S. Clarkson, R.F.C.
2260 Sergt. A. Walker, R.F.C.

Previously reported Missing, now reported Prisoner of War in German Hands.

Second Lieut. C. W. Blain, R.F.C.

Correction:

Missing.

Second Lieut. C. Elphinstone, R.F.C., should read Elphinston.



Grahame-White School, Hendon.

STRAIGHTS with instructor last week: Messrs. Norris and Culver. Circuits with instructor: Messrs. Lord, Kaizer, Rogers, Ranson, Steeves, Whiteman, Green, Wood, Travers, Robertson, Sutherland, Cockell, Edwards, Sanders, Styles, Fisher and Zambournis.

Brevet taken by Mr. Bathurst.

Instructors: Messrs. Manton, Winter, Pashley, Biard and Hale.

Bournemouth School.

PUPILS rolling alone last week: Messrs. Ross and Allen. Doing straights alone: Mr. Burry. Half circuits alone: Messrs. Davies and Holland. Figures of eight and circuits alone: Mr. Montgomery.

Instructors: Messrs. S. Summerfield, E. Brynildsen and H. Smith.

35, 45 and 60 h.p. Caudrons in use.

SUGGESTED SIGNALLING DEVICE FOR INTER-COMMUNICATION BETWEEN AEROPLANES.

WHILE it is undeniable that great strides have been made in the application of wireless telegraphy to aircraft, the fact nevertheless remains that the transmitting apparatus, if it is to have a sufficiently long radius of action to render it of any great practical value, must of necessity be comparatively heavy, a fact which is of no slight importance, especially on long-distance flights over enemy country, where every ounce counts. In addition to the disadvantage presented by the weight of the installation, receiving wireless messages on board an aeroplane is rendered difficult by the noise of the engine. Add to these drawbacks the effect of several transmitters working simultaneously, either on board a number of one's own machines or, as is well known in naval warfare, from the enemy's transmitters in an endeavour to "jam" the instruments of the opposing forces, and it will be realised that the lot of an aërial wireless operator is not an enviable one. A few moments' thought will make it obvious that under certain conditions some of which we have enumerated above, the wireless is not an ideal means of communication, especially over short distances, where some form of visual signalling, necessitating the carrying of only a small fraction of the weight of that of a wireless set, might be employed with advantage.

Several forms of visual signalling have been tried from time to time with varying success, such as the firing of coloured rockets from large pistols, Morse signals sent by means of flash lamps, and other methods for use at night, and heliographic apparatus and smoke signals for use in the daytime. The last two mentioned, however, suffer, as is well known, from many inherent drawbacks.

What appears to us to be a very promising device, designed chiefly for intercommunication between the units of an aeroplane squadron in flight, has been suggested and submitted to us by an officer, who is also the inventor of a highly interesting apparatus for the safe landing of aeroplanes at night. Our illustrations will help to show the general principle of this signalling apparatus.

Fundamentally, the instrument consists of two oscillating discs mounted on a transverse rod, which is, in turn, carried in suitable bearings on the framework of the body of the aeroplane. The two discs lie flat against the sides of the body, and their edges are prevented by outer flanges, which are attached to the body, from being blown out from the sides. On these discs are mounted a number of flaps made of fabric stiffened by steel wire or similar material. Each strip is hinged to the circular disc and is painted black on one side and white on the other, and the discs themselves are painted to correspond in such a manner that when the narrow flaps,

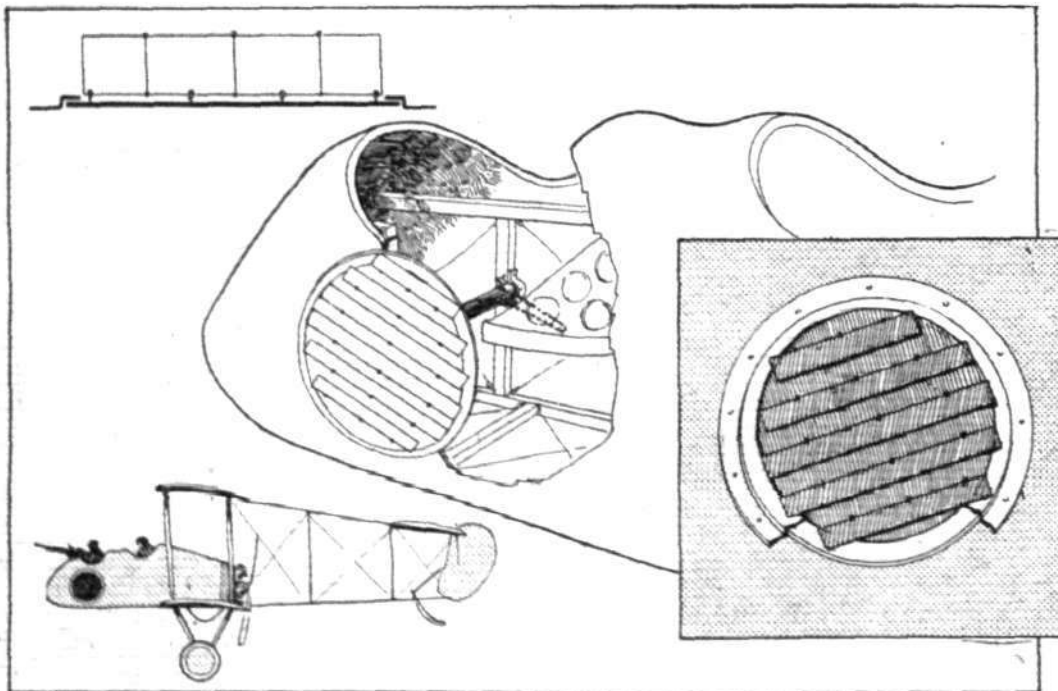
which would have a depth of about $1\frac{1}{2}$ inches to 2 inches, lie against the discs in one direction, the whole disc will show white, while when the flaps are turned with their other side outwards the whole disc will show black. In order that the wind may act on the flaps quickly, the flaps should be prevented from lying flat against the discs by, for instance, suitable projecting studs on the discs. The transverse rod would be provided at some convenient point, for instance, just in front of and below the observer's seat, with a short lever by means of which the shaft could be rocked backwards and forwards, suitable stops being provided to limit the movement in either direction.

Normally the flaps would be at an inclination to the line of flight of the machine, and kept against the discs by the pressure of the air. When the discs are moved by means of the rod until the flaps form an angle with the line of flight in the opposite direction, the flaps would turn over, thus exposing their other side.

The whole arrangement could be built very lightly, and it appears to us that some such form of signalling would be most useful for conveying orders from the commander of a squadron or flight of aeroplanes to the various units. As these discs could be made of approximately 2 ft. in diameter, signals could probably be read at a horizontal distance of some 1,500 ft. or more, according to climatic conditions, while the rate of sending should be somewhere in the neighbourhood of six words a minute. If a combination of code letters be used this rate could be considerably increased.

In addition to communication between the units of a squadron several other uses to which this apparatus might be put suggest themselves. For instance, by this means the pilot of a seaplane, by coming down to a low altitude, could signal any message by means of the ordinary Morse code, which the captain of any vessel is able to read. Also an aeroplane travelling across country could send messages to aerodromes in passing without having to come down.

The mechanical details of the device are so simple that there does not seem to be any likelihood of it going wrong, and the weight is so small as to allow installation in any type of aeroplane without regard to the particular class of work this has to do. A simple code could easily be arranged to contain all necessary messages likely to be wanted, which any pilot could learn to use with ease. The advantages appear to us too obvious to need further elaboration here. Experiments, we understand, have been made in wind currents of velocities of from 40 to 60 miles per hour with very satisfactory results, which unmistakably demonstrates its practical efficiency.



Diagrammatic sketch showing the arrangement of the device described in the accompanying article.

ANSWERS TO CORRESPONDENTS

If in doubt about anything aviatric, write to "FLIGHT" about it.

[As a number of letters have reached us lately which were signed with initials only, and some of which did not give a complete address, we should like to point out that such communications cannot be dealt with in our columns. Full name and address should always be given, and will not be published.—Ed.]

S. M. T. (Margate).

You might be able to enter the R.N.A.S. as a boy mechanic. Write to the R.N.A.S. recruiting office, Brook Green, Hammersmith, S.W. Wireless operators should write either to the Wireless Officer, R.F.C., Regent Street Polytechnic, S.W., or to the Wireless Officer, R.N.A.S., Talbot Works, Barlby Road, Kensington, W.

C. B. (Middlesbrough).

Apply to the Secretary of the Admiralty for the necessary forms and send in your application to the Director of Air Services, Admiralty, S.W. While a Probationary Flight Officer you will receive 10s. a day, with a further 4s. a day for Flying Risk while you are learning to fly. You will get a grant of £15 towards the cost of your kit, and a further £20 for khaki if ordered abroad.

D. W. B. C. (Sussex Gardens).

When the late Gustav Hamel did his famous "apple turn-over," although apparently his machine kept a straight course, it could hardly have done so strictly speaking, if by straight course you mean a rectilinear horizontal flight path. It is more probable that the flight path was curved downwards, but so slightly as to be imperceptible. As to the reasons why the machine did not side-slip on the portion of the turn-over when the wings were vertical, this was in all probability due to the relation between the momentum of the machine and the time taken to complete the turn-over.

H. C. B. (King's Lynn).

When a machine of weight W glides down a path forming an angle α with the horizontal at a velocity V , if it is allowed to strike the ground at its gliding angle—that is to say, without flattening out—the kinetic energy to be absorbed by the undercarriage = $\frac{W \cdot V^2}{2g} \sin^2 \alpha$, or, if the gliding angle be expressed as 1 in x , the kinetic energy to be absorbed by the chassis = $\frac{W}{2g} \left(\frac{V}{x} \right)^2$. It is impossible to state definitely what elevator movement is required to maintain horizontal flight at the various angles of incidence, as this varies according to the type of machine. Theoretically it should be possible, by pulling the elevator up sufficiently, to cause an aeroplane to fly at angles of incidence greater than that corresponding to maximum lift, but in practice it would be a very tricky performance, since "reversal of controls" would then come in. That is to say, in order to increase the lift the control lever would have to be pushed forward, and for decreasing the lift the tail would be dropped. In looping the loop the elevator is pulled up to such an extent as to overcome the

natural fore and aft stability of the aeroplane. An approximate estimate of the lift and drift coefficients of a non-lifting tail plane and elevator for various angles of incidence of either may be made by treating these surfaces as flat planes of this plan form, and using the coefficients for a flat plane, due allowance being made for aspect ratio. We have no particulars of the Voisin section to which you refer. The information regarding the tests made at the N.P.L. is contained in the annual reports of the Advisory Committee for Aeronautics for the years 1911-12 and 1912-13. The price is 11s. and 10s. respectively. The latter results have not been published on account of the war.

G. H. (Dunstable).

In the advertisements of "FLIGHT" you will find addresses of patent agents who would attend to the patenting of your invention. A provisional patent costs, we believe, about £1, and protects your invention for one year.

H. J. W. (Goodmayes).

In the "Answers to Correspondents" column of our issue of September 7th we published a graph of the path followed by bombs when dropped from various altitudes and translational speeds. The weight of the bomb is not included in the calculations as these took no account of air resistance. To make allowance for the effects of a head wind or a following wind, it is only necessary to add or subtract the velocity of the wind from the velocity of the machine. Thus, if the speed of the machine is 80 m.p.h. and the following wind 20 m.p.h., the ground speed will be 100 m.p.h. If the machine is flying against the wind and the velocities are the same as before, the ground speed will be 60 m.p.h. So far as we are aware, there is no reliable instrument on the market indicating the ground speed of an aeroplane.

H. G. B. (Dartmouth).

During the war no description of military aeroplanes is permitted, and we cannot therefore tell you the differences between the two machines you mention. For the same reason we are unable to answer your second question regarding which is the fastest machine going.

S. E. H. (1st A.-M.).

The resistance of an aeroplane is obtained by adding together the resistance of its component parts. It is generally divided into two parts, the resistance of the wings and the body resistance. The latter includes the resistance of the body, plane struts, wiring, tail planes, undercarriage, in short all other resistance than that of the wings themselves. The resistance of the wings depends on the area, aspect ratio, biplane spacing, and section employed. At present the only way of estimating the lift and resistance of a certain wing section is from results obtained in wind tunnel experiments, and the lift and resistance coefficients vary greatly according to the section. The resistance of bodies, struts, wires, wheels, &c., is determined in the same way from model experiments, and varies according to shape. No general formula can be given.



Rewards for Zepp. Wreckers.

It was officially announced on Wednesday that the King has been graciously pleased to appoint the under-mentioned officers Companions of the Distinguished Service Order in recognition of their gallantry and distinguished service in connection with the successful attack on enemy airships:

Second Lieutenant FREDERICK SOWREY, Royal Fusiliers, attached R.F.C.

Second Lieutenant ALFRED DE BATH BRANDON, M.C., R.F.C., Special Reserve.

Fatal Accidents.

On the afternoon of September 29th Sergt. F. Keyle and 1st Class Air-Mechanic H. Clancy, of the Royal Flying Corps, were killed through the fall of an aeroplane piloted by Sergt. Keyle.

Capt. R. K. Shives, R.F.C., was killed in a gun accident in Norfolk on September 30th.

As a military aeroplane was nearing an aerodrome on Sunday morning it fell and was completely wrecked. The passenger was instantly killed, and the pilot severely injured.

ROYAL AERO CLUB OF THE U.K.

OFFICIAL NOTICES TO MEMBERS.

SPECIAL COMMITTEE MEETING.

A SPECIAL MEETING of the Committee was held on Monday, the 2nd inst., when there were present: Prof. A. K. Huntington, in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Flight Commander C. F. Pollock, R.N., and the Assistant Secretary.

Election of Members.—The following New Members were elected:—

Second Lieut. Henry Dansey Addis (8th Seaforth Highlanders).

Flight Sub-Lieut. Sydney Harold Lionel Douglas-Crompton, R.N.

Charles George Lane.

Michel Nentsky.

Lewis Pennington.

* New Club Premises.

The negotiations for the New Club Premises have now been completed.

The House selected by the Committee is No. 3, **CLIFFORD STREET**, New Bond Street, W., which is centrally situated and within three minutes' walk of the present premises.

It is hoped that the House will be opened to Members before the end of the year.

THE FLYING SERVICES FUND

administered by

THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The Fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers, and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 166, Piccadilly, London, W.

Subscriptions.

	£	s.	d.
Total subscriptions received to Sept. 27th, 1916	10,851	16	3
Collected at the Westland Aircraft Works,			
Yeovil (Fiftieth contribution)	0	11	10
Miss Gertrude Pitt	1	1	0
Received from the Publishers of <i>Aerial Russia</i> ..	0	2	6

Total, October 3rd, 1916 10,853 11 7

166, Piccadilly, W. B. STEVENSON, Assistant Secretary.

THE "X" AIRCRAFT RAIDS.

In view of the decision of the Government not to allow details of places visited by enemy aircraft to be published, we are, as before, giving to each one an index number. Eventually, when details are available, we shall give the respective information under these index numbers, which will facilitate easy reference to each particular raid.

"X 50" Raid, September 25th-26th.

German Version.

Berlin, September 26th.

"On the night of September 25th-26th a section of our naval airships lavishly bombarded with explosive and incendiary bombs, with visible good results, the British naval port of Portsmouth, the 'reinforced' places at the mouth of the Thames, and industrial and railway installations of military importance in Central England, including York, Leeds, Lincoln and Derby. In spite of strong enemy attacks, our airships returned undamaged."

"X 51" Raid, October 1st-2nd.

The following *communiqués* have been issued by the Field-Marshal Commanding-in-Chief the Home Forces:—

October 1st, 11.45 p.m.

"A number of hostile airships crossed the East Coast between 9 p.m. and midnight. A few bombs have been dropped near the coast, but no damage has yet been reported. The raid is still in progress, and some airships are in the vicinity of London, where some guns have been in action. An airship is just reported to have been brought down in flames North of London."

October 2nd, 10.30 a.m.

"Ten hostile airships crossed the East Coast last night between 9 o'clock and midnight."

"One airship approached the North of London about 10 p.m., but was driven off by gunfire and pursued by aeroplanes. She attempted to return from the north-west, but was attacked by guns and aeroplanes and brought to earth in flames in the neighbourhood of Potters Bar shortly before midnight."

"A second airship attempted to attack London from the north-east, but was driven off about 1 a.m. A number of bombs were dropped, but no reports of casualties or damage have yet been received."

"The remaining airships wandered aimlessly over the Eastern Counties and Lincolnshire. Bombs were dropped promiscuously, but most of them appear to have dropped in the open country without doing any damage."

"The airship destroyed was of the latest type."

3.30 p.m.

"Police reports show that the total casualties as a result of last night's raid were one man killed and one woman injured."

"The material damage was insignificant, although the raiders covered a wide area and dropped a great number of bombs."

"Four houses were seriously damaged, some glasshouses were demolished, and a number of windows were broken."

German Version.

Berlin, October 2nd.

"During the night of October 2nd several naval airships successfully dropped bombs on London and military works on the Humber. Despite the heavy firing by anti-aircraft guns, all the airships returned except one, which was shot and set on fire by anti-aircraft guns and fell to earth near London."

New Regulations Against Souvenir Hunters.

By Order in Council the following new regulation has been made under the Defence of the Realm Act:—

"If any person, having found any bomb or projectile, or any fragment thereof, or any document, map, or other article whatsoever which he has reasonable grounds for believing or suspecting to have been discharged, dropped, or lost from, or to have been carried in or to have formed part of any aircraft or vessel of the enemy, or to have formed part of the equipment or personal effects of any member of the crew of such aircraft or vessel, without lawful authority or excuse neglects forthwith, after finding the same, or, in the case of any such

article which was found before October 3rd, 1916, as soon as may be after that date, to communicate the fact to a military post or to a police-constable in the neighbourhood, or on being so required, neglects to send or deliver the same to the competent naval or military authority or some person authorised by him for the purpose, he shall be guilty of an offence against these regulations."

"Where any such article is found at the place where the aircraft in question or the wreck thereof descended, no person shall, without lawful excuse, displace, remove, or otherwise interfere with such article, and, if any person does so, he shall be guilty of an offence against these regulations."



There comes a time when I get tired of things. I know a man who, what time the raiders were busy dropping messengers of death from the clouds on a Saturday night round about his house and mine, was on the flat of his back with the influenza fiend racking his limbs and prodding his brain until it throbbed and throbbed again.

He lay in bed but faintly interested, having the news brought to him periodically with the soda and milk. It was nothing to him that the Tower Bridge was being demolished for the fifth time, or that London was once more but a heap of smouldering ruins. He lay in bed comfortably warm; I, donning my greatcoat over night attire, paced the garden in slippers.

To-day he is getting better. There is a comforting fire in his study. The most luxurious armchair has been wheeled to the cosiest corner away from the draught. Female hands wait upon his every wish. He is King in his domain. Only when he is really ill does a man come into his own. Let him be but getting ill, and they will dose him with ammoniated quinine and faintly-veiled remarks illustrative of how he has brought it all upon himself by not dressing properly for the occasion. Undoubtedly the best thing to do when the gasbags come is to lie in bed and let them go hang.

There comes a time when I get tired of things. All Saturday night I stayed away from my bed to catch cold in the garden, and all Monday night I stayed up making it worse, and because my cold has arrived one day behind the fair, the heroic possibilities of the situation are lost to me. Not for me is the luxurious armchair and the cool hand to my fevered brow, but the ammoniated stuff and the tallow candle and the words without soothing cadence.

There comes a time when I get tired of things, and I am tired now of Zepp. raidings. If they do not cease quickly, they will lose me all my friends. Like meddling with other people's business, it is a thing you are better out of, for the greatest damage done by the raiders is the host of broken friendships that follow in their wake, owing to differences of opinion. Each raid has cost me dearly in lost friendships. Following a night of bomb-dropping, my friends fall away from me like the leaves from the Virginia creeper in autumn. This time, in a moment of unguardedness, I have severed the friendship of years because I ventured to disbelieve a man who told me in all sober earnestness that he saw a trapdoor open in the under part of the Zepp. and a bomb drop through.

The Exhibition of Zepp. Relics.

To the exhibition at the H.A.C. grounds in Finsbury of relics of the German airship brought down at Cuffley has now been added another marquee containing several parts of one of the Zeppelins brought down in Essex. About 12 feet of the pointed end of the airship is shown, together with two engines, one of the engine cabins, the bomb-dropping gear, propellers, gears, tanks, &c. Another instructive addition is an L.V.G. biplane captured in France.

In the early days I lost many friends who, although living widely apart, had the airship stationary right over their respective houses, but I became wise to this trap and was not caught later. I came near to losing several in previous raids who saw "the whole thing shiver as the shots struck it," and who "saw her point her nose vertically to climb out of range," but the affair was patched up by a compromise, and I should have taken heed of my tongue. But I was not prepared for the trapdoor being seen to open and a bomb slip through with the machine at something like twenty thousand feet above our heads.

A weak point in my composition is that I cannot lie low and say nothing when things do not seem to me to point to possibilities. There is that correspondent whose tale is in the dailies this week, for instance. If he were a friend of mine, I am sure that friendship would be in jeopardy. He gives a graphic account of the saving of an aeroplane by the observer after the pilot was killed. The communication cord had also been shot through. I do not know exactly what, by that name, the communication cord in an aeroplane is, but we will take it for granted that there is one. The machine dived vertically towards the ground, and all seemed about to end in a pile-up, when, at 200 yards from *terra firma*, the heroic observer wriggled out of his seat and got upon the top plane, thus restoring the balance. From this position of control he worked the rudder with his hand. The machine rapidly assumed its proper flying aspect, and came safely to earth within friendly lines. And because the writer is unknown to me, my visiting list is unaffected so far as he is concerned.

Two years ago I had never seen a Zeppelin. Since then I have seen most of those that have approached my district, including the three which dropped, finished up in flame and smoke, and I have been inclined to tell of what I have seen, but now I come to realise it, I find that people have received my statements without respectful reserve, even as I have received those of others. I am inclined to the belief that there is a kind of disease, a sort of zeppelinitis, that sets the hand of all men against his brothers, and that the best recipe is to have influenza and stay in bed out of the way of everything, and to see and say nothing.

There are times when I get tired of things, and I am tired putting forward my opinions against those of others. In future, I intend to pretend to believe everything I am told in relation to airship raids.

How Italy does it.

It has been announced in Rome that the valuable property of the Austrian Imperial family owned in Italy is to be sold, and the proceeds of the sale devoted to the payment of compensation to sufferers in towns bombarded by Austrian aircraft. It is estimated that the property, for which tenders have already been received, is worth anything from fifty to a hundred million lire (£2,000,000 to £4,000,000).

AIRISMS FROM THE FOUR WINDS.

THREE, CLIFFORD STREET, New Bond Street.

THREE minutes from 166, Piccadilly.

FIRST turning, right, in New Bond Street.

Now you all know where the new Club House of the Royal Aero Club is situated. It will probably be open to members before Christmas.

PROSPECTIVE members should join up without delay. Do it now.

DOWN this term for hearing in the King's Bench Division:—
"P.B." v. Business Newspapers, Ltd.
Palmer v. ditto.

HAPPENED last week on the following from the *Kölnische Volkszeitung*:—

"The recent mysterious stoppage of shipping traffic with England is attributed to the following. It appears the English have been successful in building a number of new airships of a semi-rigid type. The number is not great, but their usefulness is proved. There was a coast protection manoeuvre held on a great scale for the whole of the English air-fleet. In order to keep secret the number and kind of airships the English harbours were completely closed."

It should be noted the information is attributed to a neutral source.

"COUNT ZEPPELIN is reported to be ill at Stuttgart. Is this a first stage in his recent solemn vow to destroy, in a great raid, the King's palace and the principal structures of London—or die? By the seven and ten airship contingents visiting us recently, it looks as if he is keeping in cotton wool the 80 Zepps, which he claims to have ready for the job. He should hurry up with his great coup, or he may find some of our surprises will considerably modify his powers of strafing by dirigibles.

RECENTLY we noted a suggestion that the wire and other "bric-à-brac" from the Cuffley Zepp. wreckage should, in the form of souvenirs, be the means of bringing funds into the



Three, Clifford Street, New Bond Street, the new Club House of the Royal Aero Club. The building faces towards Piccadilly.

coffers of the Red Cross Society. The idea commended itself to the W.O., and a few tons of the remains have been handed over, and give promise of a splendid harvest on "Our Day," October 19th.

BUT might not these have been conserved for sale quite independently of "Our Day"? Zepp. relics combined with so good a cause as the Red Cross should ensure ready disposal of ever so many tons of such a genuine memento of the first airship down on English soil, whilst it would be a mean curmudgeon indeed who would not give of his best on "Our Day" without special inducement of tangible return. Perhaps Miss Beeman may find it's not too late even now to arrange so as to secure the double harvest.

THE *Daily Chronicle* "Office Window" chat is ever entertaining and quaint. Zepp. souvenir—*real genuine*—hunters may well ponder the following "by the way":—

"Some while ago I drew attention to the wealth lying unheeded in the streets in the shape of bolts, nuts, screws and various other fittings shed by 'buses and motor cars and embedded in the wood blocks. Nobody seems to have thought it worth while to excavate there—until last Sunday. Then, all along the streets in the suburban area where the Zepps. had passed scores of folks were to be seen, all day long, digging up the derelict scraps of metal under the fond delusion that they were remnants of bombs or shrapnel."

IF further proof positive were required of the innate barbarism of the German nation, it is to be found in their word strafing of our "Tanks" surprise. "SCHUTZENGRABEN-DREADNOUGHTS" is how the *Berliner Tageblatt* puts it. Enough to scare our caterpillars clean out of action.

A STRONGLY supported deputation to the Prime Minister upon the De Keyser Hotel ramp is under way. It is to be hoped that the entire principle will be the point put forward, not merely the case on behalf of those concerned in this particular case.

EDMONTON District Council last week ruled from the Chair with a piece of a Zepp. bomb, in substitution for the orthodox Chairman's hammer.

MR. LLOYD GEORGE is ever politic and is a great dissembler. Like the chameleon, he can adapt himself to his surroundings, judging by the following paragraph in the recent interview which our War Minister granted the President of the United Press of America:—

"The Secretary for War, who looks and acts and talks more like an American business man than any other Englishman in public life, was now 'speaking real United States.' There was scarcely a trace of the usual British intonation or accent in his voice."

Perhaps he put on a Welsh brogue.

APROPPOS our article on the control of mechanical operations by whistling. Dr. A. M. Low, the eminent consulting engineer, writes: "It might interest you to know that I had several doors in my laboratory some years ago which could be opened by whistling a certain note to them. Needless to say the same principle can be applied to any mechanical operation, but it is not in the ordinary way of great value for mechanical and other reasons."

A RECENT contribution received by the Lord Mayor for the Lord Kitchener Memorial Fund is £100 from the British and Colonial Aeroplane Co., Ltd., the makers of the Bristol aeroplanes.

THROUGH the efforts of the Overseas Club aeroplanes have recently been presented to the Imperial Aircraft Flotilla from the Chiefs and people of Kwahu District, Gold Coast; Residents of Queenstown, South Africa; Residents of Shanghai; Imperial Order Daughters of the British Empire, U.S.A.; British residents in Hankow; Residents of Auckland, N.Z. This makes 74 aeroplanes which have been given through the Club.

IN addition four machines, each costing £2,700, have been given by donors in New South Wales to form part of the Australian Air Squadron.

JUST IN TIME.—Even the Zepp. raids have had their humours. In a certain suburb a tramcar had been derailed by a bomb, and among the onlookers who gathered was a seedy Hebrew. "Have the police taken particulars yet?" he asked, and was answered in the negative. "And haven't any insurance people taken the names of the injured in this tram?" Again the answer was "No." "Vell, den," he said excitedly, "move up a bit inside and make room for me."—*London Opinion*.

THE daily *communiqués* show that during September 53 German machines were destroyed by the British, while 47 at least were driven down damaged. The French claim that 100 German machines were brought down by machines or gunners, while six others were forced to land. The Germans claim that they have accounted for 116 enemy machines. The loss of 48 British machines is admitted.

It is stated that the rays from the 1,280,000,000 candle-power Sperry searchlight set on fire a heap of rubbish situated some 200 ft. away. Seems as if that Zepp.-strafing device, the ultra-vériot rays, propounded by "FLIGHT's" tame inventor October 22nd last, is going to materialise.

THIS searchlight is the invention of Elmer A. Sperry, of gyroscopic stabiliser fame, and will, it is claimed, when mounted near sea level, render a vessel as it appears on the horizon clearly distinguishable. Some searchlight!

BERLIN was stunned by the news that we had bagged two Zeppelins. Britain also voted it "stunning."

A HAM was found in the fallen Zeppelin. A Hun-eatable souvenir, but the soldiers on guard ate it.—*Whipped Topics*.

THERE does not at first appear to be much connection between mines and aeroplanes, yet it seems that the latter's sphere of usefulness has actually been extended to mine operating. The California Aeroplane Co. is maintaining an aeroplane service over a distance of 14 miles to the Dolly Varden Mine in the Alice Arm district of British Columbia. The aeroplane makes two trips daily carrying supplies to Dolly, and returning with ore for Alice. This service, it is stated, has been the means of preventing the shutting down of Dolly Varden.

F. BJORKLUND, who used to put up quite a lot of flying at Hendon on his Blériot early in 1914, is instructing several enthusiastic New Yorkers at the aviation camp which has been established on Governors Island by some public-spirited patriots with a view to supplying pilots to the Aerial Reserve Corps.

It appears to be a quaint idea to get up a public fund with the object of presenting silver watches to the six special constables who were concerned in arresting the crew of the Zepp. which came down near the Essex Coast. So far as we have been able to ascertain, there was no special trench work required—in fact, the men seem to have been mighty glad to give themselves up.

FROM Aberdeen comes the suggestion that a Royal Flying Corps of Women should be forthwith inaugurated, with the main object of supplying the necessary air patrols for the coasts of Britain, and thus release our pilots for other objectives. "L. E. W." is responsible for this suggested innovation, which, however, we hardly think will find over much favour with those "up above," in spite of the correspondent's—he or she—arguments. After—he or she—asserting that "the young women contemporaries of the young men killed will for the most part—unless polygamy becomes a British institution—remain husbandless and homeless," the originator of this brain-wave continues as follows: "Their sex does not protect women from Zeppelin attacks. Why then should it prevent them from defending themselves and others by justifiable means? Women have often been urged to take up work for which they are not physically or mentally fitted. But there can be nothing harmful to their constitution or degrading to their dignity in conquering the air and defending their country. Risks there will be, but women have proved from time immemorial that they are no cowards, and for them, too, what better death than 'Pro Patria'?"

25,000—1,000,000!—could be provided if women were enlisted in a Flying Corps!"

So long as a million is assured, no need to worry. We could wait for the full complement of the Corps.

TEN YEARS AGO.

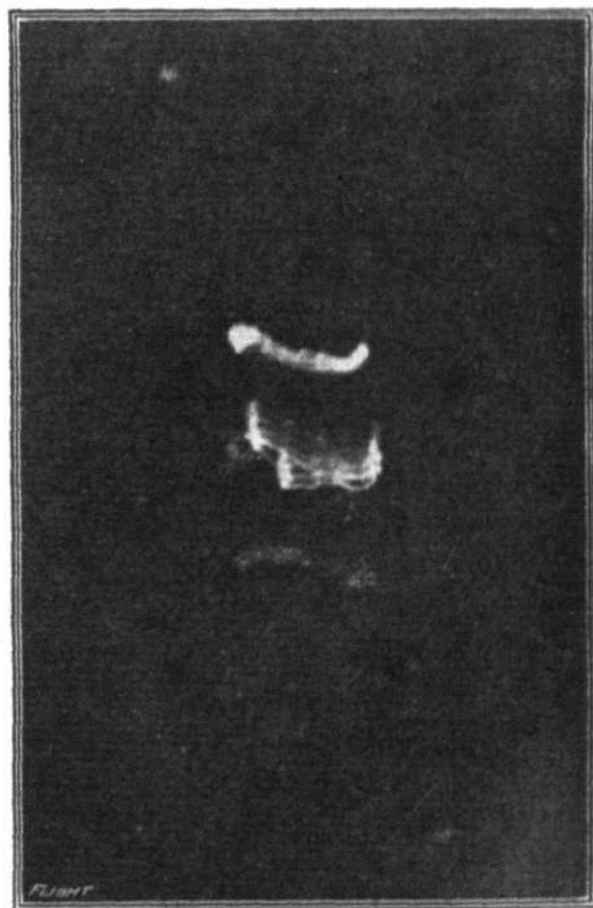
Excerpts from the "Auto." ("FLIGHT's" precursor and sister Journal) of September 29th, 1906. "FLIGHT" was founded in 1908.

THE GORDON-BENNETT BALLOON RACE.

The Gordon-Bennett Balloon Race is to start on the 30th of the present month, and England will be very effectively represented by Mr. F. H. Butler in the enormous "City of London," the Hon. C. S. Rolls in the "Britannia," and Professor Huntington in the "Zephyr." All the leading countries of Europe, in fact, will be represented by participants.

THE SANTOS DUMONT MOTOR BALLOON.

M. Santos Dumont has been for some time experimenting with lifting propellers driven by a petrol motor, as a means of diminishing the amount of ballast that requires to be carried in the car of an ordinary spherical balloon. He is using this principle in the balloon with which he will compete in the Gordon-Bennett Race. The car is fitted with a motor, a framework of bicycle tubing, and with two horizontal propellers which are driven by propeller shafts and bevel gearing. The petrol tank, which is on the other side of the car, serves to counterbalance the weight of the motor. When the balloon is in equilibrium it can be caused to rise or fall as much as required by the action of the propellers, so that the necessity for losing gas or ballast is diminished.



"THE BEST LAID SCHEMES O' MICE AND MEN."
—The above photograph of the Potters Bar Zeppelin, alight from end to end, was the first of an intended series of photographs taken on one plate at 10-second intervals to show progress. In the middle of the second exposure, however, a crowd of enthusiastic cheerers carried camera and tripod by the board, with the result seen, in the lower photo., in the mixed-up image of the Zepp.

"THE AEROPLANE OF TO-MORROW."

VARIABLE SURFACE AND STABILITY.

By LOUIS DE BAZILLAC, Engineer (École Supérieure d'Aéronautique de Paris).

Translated by B. BRUCE-WALKER, B.Sc.

IN our issues of September 4th et seq., 1914, we published a series of interesting articles by Mons. de Bazillac, in which the author showed how an aeroplane that can increase its lifting surface possesses considerable reserve of lift, speed variation and safety from nose-diving. We are glad to be able to commence this week another article by Mons. de Bazillac, in which he deals with the effect of a variable surface on stability.—ED.

Longitudinal Stability.

IN what follows it will be shown that a system of variable surface possesses a considerable reserve of automatic longitudinal stability if the shape of the variable surface can be automatically altered.

Let us give the name of "central couple" to the resultant moment of all the forces acting on the machine about the centre of gravity. We will suppose that the thrust of the propeller passes through the centre of gravity, and consider the machine as provided with a tail and having movements parallel to its plane of symmetry.

Let:

R_1, R_2 be the pressures of the air on the whole machine and on the tail, and

L_1, L_2 the distances of R_1, R_2 from the centre of gravity.

The central couple is given (Fig. 1) by:

$$\Gamma = R_1 L_1 - R_2 L_2 \quad (1)$$

When the machine deviates from its normal attitude, if the central

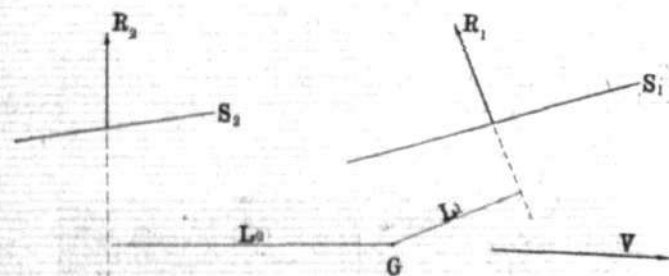


Fig. 1.

couple tends to bring it back, this couple plays the part of a restoring couple, and it is this that assures the stability of the machine.

Denote by:

V the instantaneous velocity of the machine;

S_1 the main surface;

K_1 a coefficient characteristic of this surface;

α_1 the angle of normal flight;

S_2 the surface of the tail;

K_2 a coefficient characteristic of this surface;

$(\alpha_1 \pm \epsilon)$ the angle of the tail with the direction of the speed.

(The + sign refers to the case in which the angle ϵ is situated above S_2 , and the - sign to the case in which it is situated below.)

We can write as a first approximation and for small variations of the angle of attack:

$$R_1 = K_1 S_1 V^2 \alpha_1 \quad (2)$$

$$R_2 = K_2 S_2 V^2 (\alpha_1 + \epsilon) \quad (3)$$

When the normal condition is established the central couple is zero, and we have:

$$R_1 L_1 - R_2 L_2 = 0 \quad (4)$$

Consider the variations of this couple starting from its zero value for infinitely small deviations. Expression (1) gives:

$$\begin{aligned} \delta \Gamma &= (R_1 + \delta R_1)(L_1 + \delta L_1) - (R_2 + \delta R_2)(L_2 + \delta L_2) \\ &= L_1 \delta R_1 + R_1 \delta L_1 + \delta R_1 \delta L_1 \\ &\quad - (L_2 \delta R_2 + R_2 \delta L_2 + \delta R_2 \delta L_2) \end{aligned}$$

whence, taking (4) into account and neglecting the second-order of small quantities:

$$\delta \Gamma = L_1 \delta R_1 - L_2 \delta R_2 + (R_1 \delta L_1 - R_2 \delta L_2) \quad (5)$$

We may calculate the order of magnitude of these last two moments. For this consider the ratio

$$\frac{R_1 \delta L_1}{L_2 \delta R_2}$$

Denoting by N_1 a coefficient which relates to the displacements in position and direction of R_1 , we can write:

$$L_1 = N_1 \alpha_1;$$

and the above ratio becomes:

$$\frac{R_1 \delta L_1}{L_2 \delta R_2} = \frac{K_1 S_1 V^2 N_1 \alpha_1 \delta \alpha_1}{K_2 S_2 V^2 L_2 \delta \alpha_1} = \frac{N_1}{L_2} \cdot \frac{\alpha_1}{K_2 S_2 / K_1 S_1}$$

whence, putting $\frac{K_2 S_2}{K_1 S_1} = \rho$,

$$\frac{R_1 \delta L_1}{L_2 \delta R_2} = \frac{N_1}{L_2} \cdot \frac{\alpha_1}{\rho}$$

In the majority of existing flying machines α_1 and ρ are of the same order of magnitude. When the surface of the tail is increased the ratio α_1/ρ can only be diminished thereby. The order of magnitude of the ratio α_1/ρ is, therefore, no greater than unity. As far as the ratio N_1/L_2 is concerned it is easy to see that it is hardly of the order of a hundredth, for N_1 is generally at the most a few centimetres, whereas L_2 is always several metres. In short, we see that the ratio of the moments $R_1 \delta L_1$ and $L_2 \delta R_2$ will be at the most of the order of a hundredth, and that consequently in a first approximation the moment $R_1 \delta L_1$ is perfectly negligible compared to $L_2 \delta R_2$.

With still greater reason is $R_2 \delta L_2$ negligible compared to the moment $L_2 \delta R_2$, for δL_2 and δL_1 are of the same order of magnitude, and R_2 is generally smaller than R_1 .

We see then that in a first approximation perfectly compatible with the whole of our considerations we can neglect the bracketed quantity $(R_1 \delta L_1 - R_2 \delta L_2)$. We can then write with sufficient accuracy:

$$\delta \Gamma = L_1 \delta R_1 - L_2 \delta R_2,$$

and, taking (4) into account:

$$\delta \Gamma = L_2 R_2 \frac{\delta R_1}{R_1} - L_2 \delta R_2.$$

Finally, substituting for $R_1, R_2, \delta R_1, \delta R_2$, their values obtained from (2) and (3):

$$\delta \Gamma = L_2 \rho K_1 S_1 V^2 \left(\frac{\epsilon}{\alpha_1} \right) \delta \alpha_1 = L_2 R_2 \frac{\epsilon}{\alpha_1 (\alpha_1 + \epsilon)} \delta \alpha_1 \quad (6)$$

$$\text{or } \delta \Gamma = \pm (L_1 K_1 S_1 - L_2 K_2 S_2) V^2 \delta \alpha_1 \quad (7)$$

(The + sign refers to the case in which the rear surface is lifting and the - sign to the case in which it is non-lifting.)

Suppose further that the surfaces S_1 or S_2 can be automatically increased or decreased under the influence of the gust.

The resistance of the air to the machine not remaining constant, the speed will vary during the disturbance. Can this variation in speed be neglected?

Let:

γ be the inclination of the velocity during a glide with the engine off (Fig. 2),

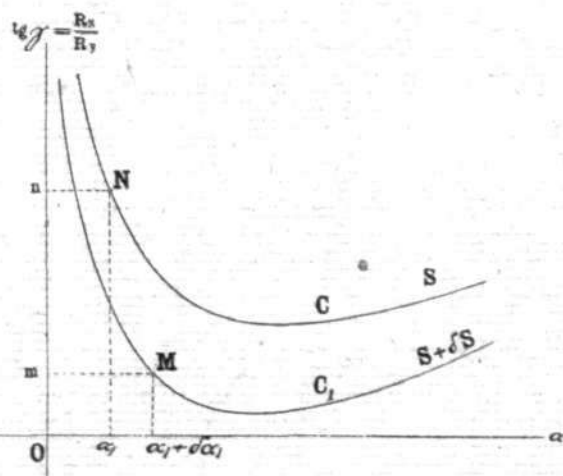


Fig. 2.

C and C_1 the curves of the inclinations γ relating to the surfaces S and $S + \delta S$, and

V_{α_1} and $V_{\alpha_1 + \delta \alpha_1}$ the speeds corresponding to the angles α_1 and $\alpha_1 + \delta \alpha_1$.

At the angle α_1 the propulsive force per unit weight was n .

At the angle $\alpha_1 + \delta \alpha_1$ the propulsive force necessary for horizontal flight has become m .

Since the thrust of the propeller has remained constant the difference of force $m - n$ makes the machine climb and measures its slope of ascent δi , or

$$\delta i = \tan^{-1} m n.$$

We have therefore:

$$\left(\frac{V_{a_1} + \delta a_1}{V_{a_1}}\right)^2 = \cos \delta i.$$

At the same time the variation of the angle of attack δa_1 through which the machine has passed at the end of the time δt has diminished. It has become at the end of this time:

$$\delta a_1 = \delta a_1 - \delta i,$$

for the inclination of the machine to the horizontal has remained the same.

For this variation of the angle of attack the value of the central couple has become:

$$\begin{aligned} d\Gamma &= \delta \Gamma \left(\frac{V_{a_1} + \delta a_1}{V_{a_1}}\right)^2 \cdot \frac{d a_1}{\delta a_1} \cdot \delta i \\ &= \delta \Gamma \cos \delta i \left(\frac{1}{1 - \frac{\delta i}{\delta a_1}}\right). \end{aligned}$$

So that the variation of the speed acquired under the influence of the disturbance might be neglected it was necessary for δi to be practically nil; it was consequently necessary to increase the angle a_1 to the minimum of the curve C_1 or to decrease $m n$, that is to say, H/W , W being the weight of the machine, and H the pull of the propeller. We would thus come to the question of means, whether an automatic regulation of the conditions of carburation of the engine or an automatic adjustment of the weights; which does not at all amount to saying, in spite of the erroneous theories of some writers, that to decrease $m n$ it suffices once and for all to increase W . The aeroplane cannot be rendered stable by its design alone. It can only become so by an automatic alteration of this design during a disturbance.

However that may be, it can be seen that the variation of the speed, $V \delta a_1$, during the infinitely small interval of time δt , will be in practice, having regard to the inertia of the masses, so slight beside the speed V_{a_1} , as to be negligible in a first approximation; and we may regard the speed V as remaining sensibly constant during the whole of the disturbance.

Under these conditions, if we return to expression (7) for the variation of the central couple, we see that the variation of this couple enhances the stability during the disturbance, whether with a non-lifting tail we increase S_1 or decrease S_2 , or whether with a lifting tail we increase S_2 or decrease S_1 , or if we increase S_2 with $(a_1 + \epsilon)$ varying alone and a_1 remaining constant.

In this last case the central couple of the machine reduces to the single couple of the surface S_2 , and we have:

$$\delta \Gamma = L_2 K_2 S_2 V^2 \delta (a_1 + \epsilon) = \frac{L_2 R_2}{(a_1 + \epsilon)} \delta (a_1 + \epsilon) \quad (8)$$

In order to render the angle of attack a_1 constant, we can imagine a forward surface S_1 freely movable about an axis C normal to the plane of symmetry of the machine (Fig. 3).

This surface is fitted in such a way that during the longitudinal oscillations of the machine it always retains an invariable incidence with regard to the relative wind. It is for this purpose furnished with a little tail $g g$, which with S_1 constitutes a rigid structure.

The displacements of this tail are magnified, and transmitted to the rear surface by a suitable mechanism.

In this manner the machine travels in calm air with reduced surface at the angle of normal flight. It resists disturbances by automatically increasing its rear surface.

Formula (8) shows that an aeroplane of which the incidence of the forward plane to the relative wind remains invariable possesses by virtue of this fact a central couple that is generally large. (A simple calculation would prove that it is practically a maximum for $S_1 = S_2$ when the tail is lifting.)

We see, further, that if the rear surface can also be doubled for a

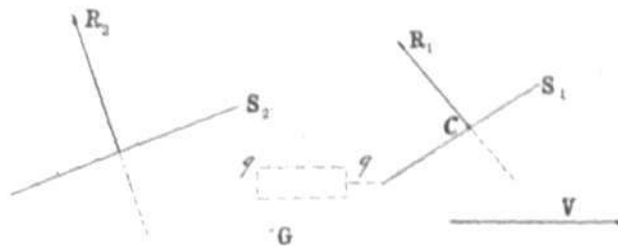


Fig. 3.

given value of $\delta (a_1 + \epsilon)$ the value of the central couple is increased in about the same proportion. We thus pass automatically from a couple that is already great with an invariable surface to a couple of double the size when the surface is enlarged. A couple of 100 kilog-metres thus becomes 200 kilog-metres. The movable arrangement proposed for this enlargement can, moreover, be employed in the case of a non-lifting tail as a forward surface for diminishing the rear surface.

The gain that it is possible to obtain in the value of the central couple by variation of surface is indeed remarkable. It constitutes for the machine a very powerful reserve of automatic longitudinal stability and for the necessities of practice one of the most convenient and perhaps the most efficacious of the methods of stabilisation advocated up till now. Everything seems to show that a machine of which the design could be automatically modified during a disturbance would gain greatly from the point of view of safety in flight, and that it would actually be rendered almost completely stable.

(To be concluded).

ALLIED AIRCRAFT CAPTURED BY THE GERMANS.

FROM time to time official *communiqués* are published in the German Press giving particulars of British and other Allied aircraft which they claim to have captured on the Western Front.

The following is the list for the month of July:—

BRITISH AIRCRAFT.

1. Caudron biplane, No. 2235, Sergt. Lesire, Mechanic Coat.
2. B.E. biplane, No. 4196, Lieut. Wingfield, 12th Wing.
3. B.E. biplane, No. 2763, Capt. Chaloner, 12th Wing.
4. B.E. biplane, No. 2648, Lieut. Monckton.
5. F.E. biplane, No. 6365, Lieut. John Hackett Firstbrook, Lieut. Burgess.
6. B.E. biplane, No. 7338, Second Lieut. C. H. A. Cox, 2nd Wing.
7. Vickers biplane, No. ?, motor W.D. 1350, Lieut. Owen Tudor Hart, Capt. G. Webbs.
8. Avro biplane, No. 2640, Cornelius van Hosterland, 12th Wing.
9. Vickers biplane, No. 6357, Lieut. Toone, Lieut. Harvey.
10. B.E. plane, No. 949, Lieut. W. Baxter Ellis, 2nd Wing.
11. Bristol biplane, No. 5746, Second Lieut. Haward.
12. Morane monoplane, 833 A. 175, Major J. J. Waldron, 60th Squadron.
13. B.E. biplane, No. 4073, Lieut. W. J. Castle, 13th Squadron.
14. Bristol biplane, No. ?, Lieut. J. L. Whitty, Capt. D. N. Veitch, 70th Squadron.

15. B.E. biplane, No. 5765, Lieut. Eric Jovett, Corpl. Johnston, 4th Squadron.
16. B.E. biplane, No. 2192, Lieut. Hewson.
17. Macfarlane, No. 7301, Lieut. R. W. Nichol.
18. F.E. biplane, No. 6952, Second Lieut. D. H. Macintyre, Second Lieut. H. Floyd.
19. Vickers biplane, No. 6949, motor A.I.D.W. 423/6979, occupants burnt.
20. Vickers biplane, No. 6011, Lieut. Kerr.
21. F.E. biplane, No. 5233, Lieut. Butterworth, Lieut. MacEwen, 18th Squadron.
22. Sopwith biplane, No. 9653, Lieut. Hele-Shaw.
23. Bristol biplane, No. 7333, First Lieut. H. Clements Finnerty, 12th Wing.
24. Morane-Saulnier biplane, No. ?, Capt. H. G. Evans, First Lieut. H. O. Long.
25. Morane monoplane, No. ?, motor burnt, Lieut. Peterson (American, killed).
26. Bristol biplane, No. 2100, Lieut. R. M. Wilson (? Wilson Brower), 70th Squadron.
27. Martinsyde biplane, No. 7471, Lieut. Graham, 27th Squadron.
28. Martinsyde biplane, No. 4704, Lieut. E. R. Farmer, 27th Squadron.

A similar detailed list is also published of 20 French biplanes, making altogether, says the Berlin *communiqué*, 48 aircraft, as opposed to six German aircraft left in the enemy's hands.

Personals

Casualties.

Lieutenant C. E. N. COOPER, Lincolnshire Regiment, attached R.F.C., who fell on September 16th, in his twenty-sixth year, was the eldest son of Mr. and Mrs. Geo. C. Nooth Cooper, of South Norwood. He was educated at the Whitgift Grammar School, Croydon, and after six years' service in the Mercantile Marine, he obtained an appointment with Messrs. Geo. Cradock and Co., wire rope makers, of Wakefield, Yorks. He enlisted in the Queen Victoria Rifles in October, 1914, and obtained his commission in the Lincolnshire Regiment, Special Reserve, in February, 1915. In April, 1915, he was sent to the Front, and served there with his regiment until about three months ago, when he was lent to the Royal Flying Corps as a balloon observation officer. His death was caused by his parachute failing to act when compelled by an accident to descend from his balloon.

Second Lieutenant FREDERICK ST. JOHN FORD NORTH ECHLIN, Royal Fusiliers and R.F.C., was killed in action on September 26th. He was in the Malay States on the outbreak of war, and came home and volunteered for service. He was gazetted to the Royal Fusiliers and afterwards transferred to the Royal Flying Corps, quickly gaining his pilot's certificate. In March last he married the daughter of Major Saumarez Dorbée, of Ronceval, Guernsey, and granddaughter of the Dean of Guernsey.

Lieutenant J. HUGH GALE, R.F.C., who was reported missing, it is now announced has been killed at the Front. He was educated at Marlborough and Hertford College, Oxford, and was the only son of Mr. and Mrs. John Gale, Cuddesdon, Oxon.

Lieutenant C. W. HARDMAN, R.F.C., who has been killed while flying at the Front, was 28 years of age, and was the only son of Mr. and Mrs. Hardman, of Bengoe, Hertford Road, East Finchley. He was educated at East Finchley Grammar School and Christ College, Finchley. Before the war he held an appointment at Clerkenwell County Court, but left it to join the Seaforth Highlanders. After eight months' training he obtained a commission in the Middlesex Regiment. He went to the Front about five months ago, and was given the position of trench mortar commander to the battalion. Lieutenant Hardman was transferred to the Royal Flying Corps only about a fortnight ago.

Second Lieutenant CLAUDE D. HIGGINS, R.F.C., who was killed on September 22nd, was the younger son of Mr. and Mrs. F. W. Higgins, of Chittagong. He obtained his pilot's certificate in August, 1916, and went to the Front a few days later. He had returned from India in the spring after having fulfilled his contract with Messrs. Hearty and Gresham, engineers, of Calcutta.

Second Lieutenant VICTOR RICHARD HUMPHREYS, Royal Berkshire Regiment, who was killed on September 25th, in his nineteenth year, was the second son of Mr. and Mrs. Richard Humphreys, of Dunallan, Mill Lane, West Hampstead. He was on the eve of being transferred to the Royal Flying Corps. He was educated at the Haberdashers' Company's School, Cricklewood, and joined the Public Schools Brigade in September, 1914, from which he obtained a commission and was gazetted to the Royal Berkshire Regiment in May, 1915. He went to the Front in April, 1916.

Lieutenant IAN CAMERON MACDONELL, R.F.C., reported missing on July 2nd, with Lieutenant Williamson, his observing officer, is now reported to have been killed in action on that date, his aeroplane being shot down. He was the only surviving son of Brigadier-General A. C. Macdonell, C.M.G., D.S.O., commanding a Canadian Infantry Brigade, and Mrs. A. C. Macdonell. Born in Lethbridge, Alberta, in 1895, he was educated at Winnipeg, Manitoba. He obtained his brevet from the Royal Aero Club as a pilot in December, 1913, after passing through the Bristol School of Flying at Brooklands. Soon after the outbreak of war he was gazetted a Lieutenant in his father's regiment, Lord Strathcona's Horse. In March, 1915, he became A.D.C. to Brigadier-General J. E. B. Seely, C.B., D.S.O., commanding the Canadian Cavalry Brigade, and served with them in the trenches, including the battle of Festubert, till he became attached, on probation, to the Royal Flying Corps in September, 1915. He was

gazetted Flying Officer on November 6th of the same year. He met with a serious accident through the failure of his engine in December, 1915. His observer was killed, and he himself more or less seriously injured. He reported for duty with the Royal Flying Corps on May 18th, 1916. He was a grandson of Lieutenant-Colonel J. T. Campbell, a Crimean veteran, and his father belonged to a Cadet family of the Macdonells of Glengarry, who have given so many officers to the Empire.

Second Lieutenant JOHN MORTON MANSEL-PLEYDELL, Royal Field Artillery (died of wounds on September 22nd), aged 32, was elder twin son of Canon Mansel-Pleydell, lately Vicar of Sturminster Newton, Dorset. He was co-inventor of a very important improvement in anti-aircraft gunnery. He was educated at Winchester and Trinity College, Cambridge, graduating in the Classical Tripos (second in Class II). He returned from the Malay in September, 1914, and obtained a commission in the R.F.A. the following December, and went to the Front in August, 1915. He died of wounds received in action on September 22nd.

Captain KENNETH ALGERNON BROOKE MURRAY, A.S.C., attached R.F.C., whose death is announced, was the only son of Major Brooke Murray, late Indian Army, of 7, Painswick Lawn, Cheltenham. He was in his twenty-fifth year. He was educated at Cheltenham College, 1906-10, and was in the college Bisley teams in 1908, 1909 and 1910. He entered Sandhurst in September, 1910, and was gazetted to the Army Service Corps in 1911. He proceeded to France in August, 1914, and took part in all the operations from Mons to the Marne and Aisne, Ypres and Armentières. He served as Adjutant of the Advanced Horse Transport Depot from April to July, 1915; as Staff Captain, G.H.Q., July to October, 1915; as Embarkation Officer at Marseilles, November, 1915, to April, 1916, and at Divisional Ammunition Park, April to June, 1916, when he was attached to the Royal Flying Corps as a Flying Officer Observer. He died on September 23rd of wounds received in an air fight against three enemy aviators on September 16th.

Lieutenant PHILIP RYLAND PINSENT, R.F.C., reported killed, was educated at Horris Hill and Winchester. He obtained a commission in the Royal Flying Corps in April, and went to the Front early in July. He was severely wounded in an air fight on September 23rd, and died on September 24th, the eve of his nineteenth birthday. He was the youngest son of Mr. and Mrs. R. A. Pinsent, of Selly Wick, Birmingham.

Second Lieutenant MICHAEL H. F. THUNDER, of the R.F.C., who died at Norwich from burns received in a flying accident, was buried at Ramsgate on September 29th with military honours. He was the son of the late Mr. George Thunder, of Lagore, Meath, and grandson, on his mother's side, of Pugin, the architect. He was educated at St. Augustine's College, Ramsgate; he had his commission in December, 1915, and was gazetted flying officer in March of this year. Six officers of the Flying Corps acted as bearers, and the officer in command arrived by aeroplane.

Captain HUGH CHRISTOPHER TOWER, Flight-Commander R.F.C. (officially reported missing, but believed to have been killed in air combat in France on September 10th), aged 30, was the only surviving son of Christopher J. H. Tower and Mrs. Tower, Wealdside, Essex. Educated at Sir Anthony Browne's School, Brentwood, and abroad, he passed the Surveyors' Institute examination and was sub-agent on the estates of Lady Heytesbury and the late Sir Edmund Antrobus in Wiltshire. On the outbreak of war he volunteered for Special Reserve, R.F.C., and joined at Farnborough on August 15th, 1914. He was flying in France from April, 1915, until he returned to England on promotion to Flight-Commander on November 1st, 1915. After six months' work in England, Captain Tower resumed his duties at the Front last May, where his skill and fearless bravery were well known. His elder brother, Lieutenant Christopher C. Tower, Essex Yeomanry, A.D.C., 12th Division, was killed in action on October 2nd, 1915. Captain Tower was at Sir Anthony Browne's School from 1898 to 1902.

Married and to be Married.

The engagement is announced of Major ALEXANDER CLEGHORN, R.F.C., elder son of Mr. and Mrs. Alexander Cleghorn, 14, Hatfield Drive, Glasgow, and MORAG, daughter of Professor and Mrs. ARCHIBALD BARR, Westerton-of-Mugdock, Milngavie, Stirlingshire.

A marriage will shortly take place between Flight-Sub-Lieutenant CECIL HENRY FITZHERBERT, R.N.A.S., youngest son of Mr. and Mrs. Henry Corry FitzHerbert, of Abbeyleix, Ireland, and ELLEN KATHARINE (KITTY), eldest daughter of Mr. and Mrs. WALTER LOWNDES, of Broomfield, Hoylake, Cheshire.

**AIRCRAFT WORK AT THE FRONT.****OFFICIAL INFORMATION.****British.**

War Office, September 26th.

"*Salonica. Doiran Front.*—Hostile artillery and aircraft displayed considerable activity. Our aircraft engaged enemy machines on three occasions and drove them off."

General Headquarters (France), September 27th, 1.4 p.m.

"Three hostile aeroplanes were destroyed in air fighting on the 25th inst., and six others driven down damaged."

General Headquarters, September 27th, 11 p.m.

"Two enemy aeroplanes and two kite balloons were destroyed by us yesterday. Two of our machines are missing."

War Office, September 28th.

"*Salonica. Doiran Front.*—The enemy's aircraft has been very active, and it is reported that one machine was brought down by our fire."

"*Struma Front.*—The railway station at Angista was bombed by aeroplanes of the R.N.A.S."

General Headquarters, September 29th, 10 p.m.

"In spite of the weather, our aeroplanes have done useful work, attacking enemy reinforcements on the move. Yesterday enemy aircraft patrolled actively behind their own lines, but showed little offensive enterprise. One enemy machine was destroyed, and one of our own has not returned."

War Office, September 29th.

"*Salonica.*—Enemy aircraft displayed considerable activity."

"*Tigris Line.*—Our aeroplanes bombed the enemy's aerodrome on the morning of the 23rd inst., and again on the 27th, apparently with good effect."

General Headquarters, September 30th, 10.29 p.m.

"On the 28th two enemy aeroplanes were brought down, in addition to the one mentioned in last night's report."

War Office, September 30th.

"*Salonica.*—Aeroplanes of the R.N.A.S. bombed Angista Railway Station."

General Headquarters, October 1st, 10.15 p.m.

"Yesterday two of the enemy aerodromes were successfully bombed by our aeroplanes, and at least one machine destroyed. In the fighting over the Front four enemy machines were brought down, and one of our own is missing."

"Enemy troops and transports have been repeatedly attacked from the air with machine gun fire, and in one case several hundred infantry were dispersed."

General Headquarters, October 2nd, 11.2 p.m.

"During yesterday's operations our aeroplanes bombed several points of military importance. An enemy kite balloon was brought down in flames. There were many fights in the air, in the course of which two enemy machines were destroyed and many others driven down. We suffered no losses."

French.

Paris, September 25th. Afternoon.

"Two enemy airmen yesterday just after 8.30 p.m. dropped 10 bombs on Lunéville Station. One woman was slightly injured. The material damage was insignificant."

"During yesterday an enemy aeroplane attacked by one of ours fell damaged north of Miserey. Three other machines seriously hit were forced to come to the ground."

"During the night of September 24th-25th 12 of our aeroplanes dropped 98 bombs on the village and station of Guiscard. The same night seven of our aeroplanes dropped 50 bombs of 120 mm. on the factories of Thionville and

Captain JOHN SOWREY, R.F.C., eldest son of Mr. J. W. Sowrey, Yeoveney Lodge, Staines, was on September 16th married at Hythe (Kent) Parish Church to Miss SIBYL AUDREY ADAM, youngest daughter of the late Dr. James Adam, of Malling Place, West Malling, and Mrs. Adam, Quarry Down, Hythe. A feature of the event was a visit of aeroplanes by brother officers of the bridegroom, and during the ceremony they gave an exhibition of flying over the church and town, looping the loop, spirals, &c.

Items.

The will has been proved of Temporary Second Lieutenant JOHN ROBERT GOBERTUS WHITEHEAD, R.F.C., who was killed in an aeroplane accident, August 3rd, at £23,772.

Rombach and on the station of Audun-le-Roman. A fire was observed at Rombach as a result of the bombardment."

Paris, September 26th. Afternoon.

"Yesterday (Monday) our chaser-planes fought 47 engagements on the Somme front. Five enemy machines were brought down, while three more, which were seriously damaged, were obliged to alight. Another machine, which was attacked at close quarters with a machine gun, fell in a disabled condition, but could not be followed to the ground."

"During these engagements Second Lieut. Heurtaux brought down his eighth machine, in the direction of Villers Carbonel, and Warrant Officer Dornie brought down his twelfth machine north of Lieramont. In the Woivre, Warrant Officer Lenoir attacked an enemy machine constructed to carry three, and after a very hard fight brought it down near Fromezey (north-west of Etain). This is the eleventh machine brought down to date by this pilot."

"Our bombarding squadrons carried out the following operations: On the night of Sunday to Monday 200 bombs of 120 mm. were dropped on the blast furnaces of Dillingen, on the factories of Sarrelouis, and on the railway station of Metz Sablons. Twenty-two bombs were dropped on the blast furnaces of Rombach and on the railway line between Metz and Thionville. During the evening of September 25th four of our machines, armed with guns, fired 82 shells on the enemy organisations of Sully, Saillies and of the Bois de Saint Waast. On the afternoon of the 25th 30 bombs were dropped on bivouacs in the region of Montfaucon Nantillois and 12 on the military installations near Ozannes. Finally, last night our aircraft dropped 102 bombs on the railway station of Noyon and 52 bombs on the aerodromes of Hervilly, the railway stations of Ham, Fins and Voyennes."

"Yesterday afternoon an enemy aeroplane dropped two bombs, which fell on the dunes north-east of Calais, without any result."

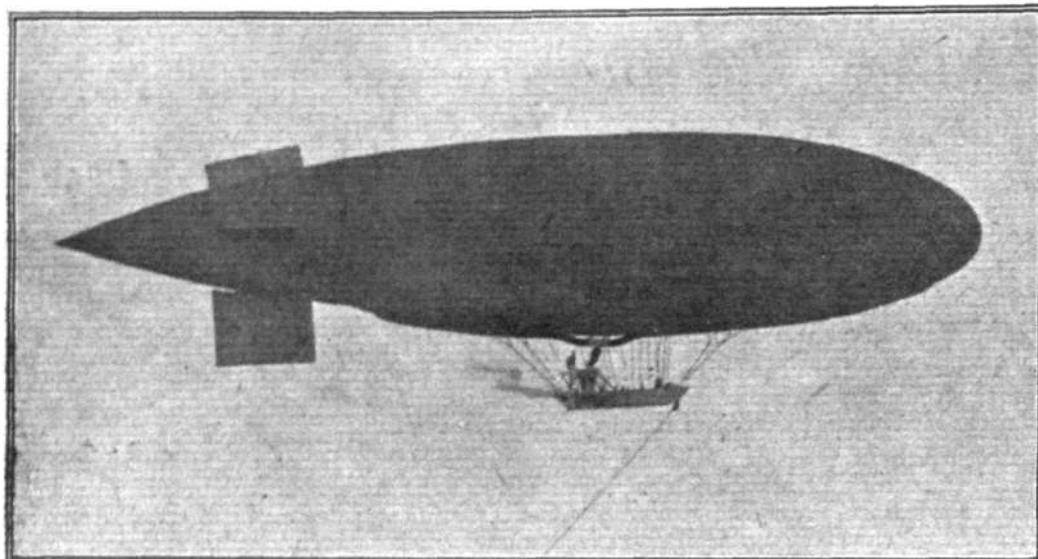
Paris, September 26th. Evening.

"It appears from fresh information that the Zeppelin which flew over the Calais district during the night of September 22nd and 23rd dropped 20 bombs, all of which fell in waste ground at a great distance from the town. It is probable that, caught by the fire of our guns, the Zeppelin got rid of its projectiles in order to ascend higher and escape."

Paris, September 27th. Afternoon.

"On the Somme front our aviators yesterday (26th) engaged in a number of fights. Sub-Lieut. Nungesser in the course of this day alone brought down two German aeroplanes between Le Transloy and Rocquigny, and an enemy captive balloon, which fell in flames in the Neuville district. These three victories bring up to 17 the number of machines brought down by this pilot up to yesterday. Two other German aeroplanes, which had been seriously hit, fell out of control, one towards Le Transloy and the other near Le Mesnil Bruntel. Another captive balloon attacked by one of our pilots collapsed near Nurlu."

"In Champagne a Fokker, attached at close quarters, fell at first in spirals, then vertically, and was smashed crashing to the ground at Grateuil (north-west of Ville-sur-Tourbe). Last night (26th-27th) a group of 14 of our aeroplanes dropped 110 big-calibre bombs on the railway station, the railway lines and the hutments at Appilly. The night before (25th-26th) the railway station at Laon got 22 bombs, and the bivouacs at Montfaucon 17."



The Japanese Parseval army airship "Yūhi" at its home ground.

Paris, September 28th.

"Salonica.—Our aeroplanes bombarded Konali, south-east of Monastir."

Paris, September 29th.

"In the course of yesterday a Fokker, attacked by one of our pilots, crashed to the ground north of Rheims. Another Fokker, badly hit, nose-dived into its own lines."

Paris, September 30th.

"Our bombarding aeroplanes dropped a large number of bombs on Prilep."

"Another of our machines bombarded Sofia yesterday morning, and continued its flight to Bucharest, where it landed safely."

Paris, October 1st.

"One of our aeroplanes has bombarded Sofia, and continued its journey to Bucharest, where it landed."

Paris, October 2nd.

"It is confirmed that Maréchal de Logis Vialet brought down his fifth German aeroplane in the region of the Somme."

"Warrant Officer Bloch brought down a German captive balloon east of Bapaume. This is the fifth balloon brought down up to now by this pilot."

Italian.

Rome, September 27th.

"Last night one of our airships, in spite of adverse weather, succeeded in reaching the Carso, dropping bombs on a column of enemy troops and convoys on the road from Comignano to Castagnevizza. Although discovered by the enemy's searchlights, and fired on by artillery, the airship returned safely."

Russian.

Petrograd, September 26th.

"An enemy aeroplane of the Ilya Mouromets type appeared over Hitzenberg Station and threw 17 two-pood (72-lb.) bombs, without causing any damage."

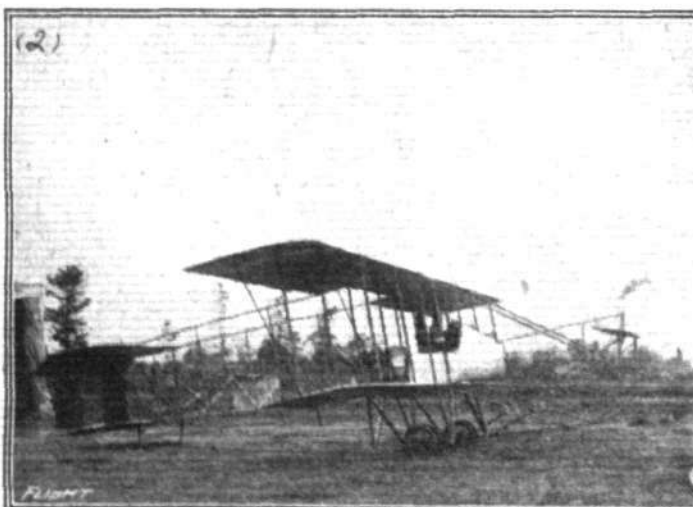
"In the region south of Dvinsk one of the enemy aeroplanes, being fired upon by our artillery, turned over and was compelled to land. It was observed that the machine became enveloped in black smoke as it descended towards the enemy's lines."

Petrograd, September 28th.

"On September 26th our seaplanes, under the command of Lieut. Gorkovenko, made a successful raid on the enemy aerodrome on Lake Angern, and dropped bombs on their objective. Our machines were subjected to the fire of the enemy batteries, and were engaged in combat with 20 enemy machines. During this unequal contest Lieut. Arseni Gorkovenko unfortunately perished, and his aeroplane was lost."

Petrograd, September 29th.

"The Centre.—Our airmen carried out a raid on the rear of the enemy's cantonments in the Borguny-Krevo district. The bombs dropped caused explosions and fires in the enemy's depôts at various points. Bombs were also dropped on convoys, a narrow-gauge railway, and on wagons. In the course of the raid there was an air fight, in which four German machines were brought down. One of our air aircraft, after a fight with two Albatros machines, fell in the enemy's lines. In addition to this, we lost a machine of the Morane-Parasol type."



AVIATION IN JAPAN.—On the left, three-quarter front view of the 70 h.p. army biplane No. 6 at Nagoya parade ground. On the right, Japanese military aviator Lieut. Takeda, in the pilot's seat of the latest army biplane (M. Farman type) which he has been flying at Tokorozawa aerodrome.

Petrograd, October 1st.

"In the region south of Brzezany an aerial encounter with a German Albatros took place. The gallant Staff Cavalry Captain Tchirkoff attacked an enemy aeroplane and forced him to descend abruptly in the German lines."

Roumanian.

Bucharest, September 24th.

"Last night a Zeppelin succeeded in reaching Bucharest, but was driven off by our guns. During its journey the airship dropped three incendiary bombs, which caused no damage."

Bucharest, September 26th.

"An air squadron yesterday afternoon dropped bombs on Bucharest. No military damage was done, but the bombs fell on a sanatorium and an orphanage, killing 60 of the inmates and injuring many others. More than two-thirds of the victims were women and children."

"During the night of the 25th a Zeppelin dropped bombs on Bucharest, killing five children. Our aircraft dropped bombs on camps in Transylvania."

Bucharest, September 27th.

"Hostile aeroplanes yesterday dropped bombs on Bucharest and the neighbouring villages, causing some loss of life, especially among women and children."

"During last night a Zeppelin dropped incendiary bombs on Bucharest, causing two small fires, which were quickly extinguished. One woman was killed and another injured."

"The Zeppelin was driven off by our artillery."

"In the region of Toplitza our guns brought down an enemy aeroplane."

Bucharest, September 29th.

"Hostile aeroplanes dropped bombs on Cerna Voda, Alexandria and villages south of Bucharest. An enemy aeroplane was brought down near Padosu, in the Mehediutzi

Department. An enemy aeroplane arrived at Bailesti from the direction of Salonica."

Bucharest, October 1st.

"In attacks by enemy aeroplanes bombs were dropped on Bucharest, where two women and five children were killed; on Cerna Voda, and on Budesti."

German.

Berlin, September 25th.

"In yesterday's numerous aerial engagements we shot down nine aeroplanes. Our anti-aircraft guns have brought down four airmen during the last few days."

"Six citizens were killed and 28 seriously wounded by an enemy bomb attack on Lens."

Berlin, September 26th.

"A Russian giant aeroplane near Borguny, west of Krevo, after a hard fight with one of our airmen, was shot down. In the same region a Russian monoplane also succumbed in the course of an air fight."

"This morning the naval air station on Lake Angern (west of the Gulf of Riga) was again unsuccessfully attacked by two Russian seaplanes. Our aeroplanes succeeded in engaging one of the seaplanes above the Lake, and shot it down after a short fight. The second seaplane was damaged by our artillery fire, and escaped in the direction of Runo Island."

"An airship and aviators again attacked Bucharest."

Berlin, September 27th.

"Yesterday and the day before six enemy aeroplanes were brought down in aerial fights on the Somme. Another machine was brought down yesterday in Champagne."

"The airship and aeroplane attacks on Bucharest were repeated."

Berlin, September 30th.

"Our aeroplane squadrons successfully attacked the railway bridge of Cerna Voda and enemy camps."

From Other Sources.

Mr. W. Beach Thomas, in one of his despatches to the *Daily Mail*, also writes on the subject as follows:—

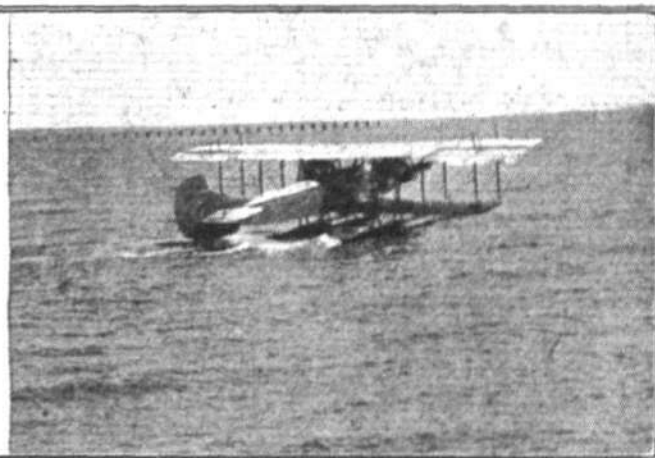
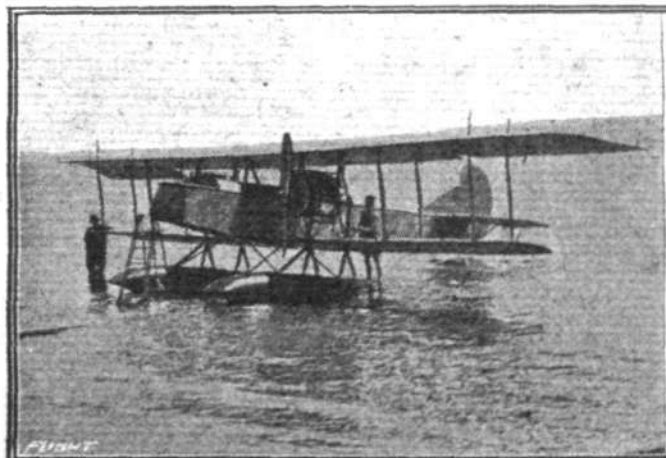
"But only in one respect, I should say, does his reluctant admiration of his enemy entail any contempt for himself. He admires his own artillery at the same time that he admires ours; but nothing of this common respect colours his view of his own air service. The Iron Cross of the airmen has entered into the soul of the infantrymen. 'The airmen,' he says, 'sit covered with medals in the best restaurants and grow fat; but as for flying they never think of going near Mr. Englishman.'

"Comparison of the two air services is a common subject of trench talk in German ranks. 'The Englishmen come so low you have to take care the propeller doesn't hit your head,' wrote one German. 'You can't move by day or they see you, and perhaps shoot at you.' 'Some day they'll come and take us out of the trenches by the scruff of the neck.' Such sentiments could be quoted for pages. The soldiers are probably unfair to their own men; but it is true

that the loss of the offensive in the air has supremely depressed the German Army and increased its admiration for the British and French opponent."

Mr. Philip Gibbs, in a despatch to the *Daily Telegraph* on September 12th, writes:—

"We are still below the line of the Ginchy telegraph on the high plateau, so that we have not yet obtained full observation of the valley slopes on the other side, though by the capture of Ginchy itself we have robbed the enemy of his old point of view, which was of enormous value to him in registering upon our batteries and watching our movements. His only means of observation now is from the air, and yesterday there was visible proof of this, because fifteen or sixteen of his kite balloons came creeping out of the clouds above the plateau here, peering at us at close range. I should hate to be a German observer in one of those 'sausages,' as our men call them. They have a painful reminiscence of six such gas-bags brought down on one day, which was June 30th last, before the great battle began. Since then they have not floated



(Photos. by courtesy "Scientific American.")

THE CURTISS TWIN-ENGINE HYDROBIPLANE.—On this machine Victor Carlstrom, on August 25th last, put up a new American distance record, flying a circular route between Newport News and Cape Charles of 661 miles in 8 hrs. 41 mins. The weather was bad, and he carried as passenger a mechanic, whose services, however, were not called upon throughout the trip.

aloft with any safety. On September 1st two of them were attacked by one of our air-pilots, who fired machine guns at them and dropped bombs on to them so that they had to haul down hurriedly in a great scare, and a few days ago one of our knights-errant of the air crossed the enemy's lines at nearly 12,000 ft., mounted directly above a German balloon, and dived upon it, until he was no higher than 500 yards above it. Then he fired until he almost touched the great bag, and as he passed, it burst into a vast flame and was burnt to a wisp of smoke in a few seconds.

"For fighting purposes these German 'Peeping Toms' are not safe and certain means of observation, with our airmen hovering near them, even though they have adopted a new means of defence, which is a gun below them sending up a high-reaching flame to scorch the wings of any British moth who dares to come too close. Our moths will take the risk, I guess. To-day a German plane did come across our lines, where I was wandering about some old dug-outs and trenches, watching out batteries plug away in a leisurely style, and wondering at the relative quietude of an 'off day' of battle. But that hostile bird was scared back by some of our hawks, and they followed him well into his own country of the sky, with their usual audacity.

"There is no humbug about all this. On this part of the battle-front we maintain the mastery of the air and blind the enemy's point of view. It makes all the difference to our artillery, and it is extraordinary to go through the recent history of the Royal Flying Corps and to note how many German batteries have been put under heavy gun-fire by aerial registration. It is not easy to knock out a battery by a direct hit. A gun is a small target, and shells may crump it all round and leave it unscathed; but on the laws of luck we have certainly scored many direct hits during the last week or two. Many ammunition dumps and pits have been blown up after aerial reports, as I have seen myself several times, watching the high, enduring volumes of black curly smoke."

Tribute from the Enemy.

TESTIMONY that the British and French pilots hold the mastery in the air at the Front is forthcoming in a number of letters and diaries which have been found on prisoners. Thus the *Morning Post* correspondent quotes the following from the diary of a German officer:—

"August 1st. . . . Our aviators are—none of them show themselves above our lines.

"August 2nd.—The French aviators fly about 600 ft. above our lines, while none of ours put in an appearance. We cannot fire on them without immediately attracting heavy artillery. We have, therefore, to remain in our trenches, where it is as hot as ever, dying of thirst, and waiting to be killed or buried by shells.

"August 3rd.—The French use nothing but heavy guns,

and have been bombarding us all day, their fire control being beyond reproach as the result of the action of their aviators; but ours still keep out of sight. The French aviators are masters of the air.

"August 6th.—The value of our aviators is so small that even far behind the lines they are not masters of the field. Generally our aviators are far from being as good as the French or English, and consequently we do not dare to move a step outside our leaf-covered shelters. Enemy aviators keep circling round the wood we are in and signalling our presence. Whether we like to recognise it or not, it is evident from this point of view we are inferior. We are told that Germany is holding her own in the air, but it is no use telling us that, and that is why we have these enormous losses. There is absolutely no one to drive away these parasites that give us no respite from dawn till night. The moral effect on us all is as bad as it can be. Final success, however, depends on the co-ordination of all available arms, and that is what is wanting here. The situation is the more astonishing because of the large number of French aeroplanes that we bring down.

"August 12th.—Enemy aviators flying at 100 metres took part in the fighting with machine guns. Some of our men were wounded in the head by bullets from above."

In a diary, according to Reuter, found on a soldier of the 125th Regiment, captured in Delville Wood, the following occurs:—

"During the day one hardly dares to be seen in the trench, owing to the English aeroplanes. They fly so low it is a wonder that they do not pull one out of the trench. Nothing is to be seen of our German hero-airmen, and yet the brilliant ratio is supposed to be 21 to 89. The fact that the English are a thousand times more daring was, however, not mentioned. One can hardly calculate how much additional loss of life and strain on the nerves this costs us. I often feel doubtful regarding the issue of our good cause when such bad fighters are there to champion it. No one out here needs to be foolhardy, but everyone has the duty and responsibility of so filling his place that he can always answer to his conscience."

The same correspondent quotes an extract from a German regimental order:—

"Every man is to find himself a hole, and is not so much as to show his nose except when the sentries are detailed. The shooting was quite exceptional this morning, due to the fact that the officers and men of the 8th Company, 2nd Battalion, 104th Regiment, were swarming about and making themselves at home. This will not do, as we are at war. Every movement is seen from enemy aeroplanes or from the neighbouring village of Longueval. For this reason the trench must appear dead. The standing about of sentries, orderlies and relieving sentries is forbidden, and strict silence is to be maintained."

UNAFFILIATED MODEL CLUBS DIARY AND REPORTS.

Club reports of chief work done are published monthly. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Finsbury Park & District (66, SOUTH VIEW RD., HORNSEY).

Monthly Report.—The past two months have been very eventful for this club, both as regards the quality of the flying and the number of models employed. Four new members have also been enrolled, three of whom are attached to the Junior Section which has recently been formed. A club meeting was held at Mr. Hardinge's (Vice-Secretary) house on September 14th when several changes were made in the management of the club, and a new procedure for determining the results of competitions was discussed. A Junior Section, mentioned previously, was formed at a reduced annual subscription, while a Model Engineering Section, which has been working privately for a year, was officially recognised and attached to the club. Most of the flying took place in September. On August 5th Mr. E. Coleman was flying his hollow-spar model, a Morane tractor was flown by Mr. F. E. Rayner, and at the end of the afternoon they both made some fine r.o.g. flights. Mr. A. Richards tested a hollow spar, but owing to a "floppy" plane no prolonged flights were made. On the 10th only two machines were flying. They were both Morane type, "piloted" by Messrs. W. Hardinge and F. E. Rayner. September 2nd was also a quiet day, Mr. Hardinge being the only member out. The 9th was fairly busy. Messrs. E. Coleman and A. Richards were at work with their hollow-spar models, making many flights of 1 mile. Mr. Rayner's Morane especially distinguished itself at dusk when it was rising off the ground without a push, and flying about 400 yards. The plane of Mr. Hardinge's model broke at the beginning of the afternoon, which rendered him *hors de combat*. Two more hollow-spar models were flown by Mr. C. J. Burchell, a new member, very successfully. The chassis of these machines are quite novel, and altogether the machines are of pleasing design. The 16th was the most successful day. No fewer than twelve models were at work, nine of which were attached to the club. Hollow spars were much in evidence, and were making some very spectacular flights, owned by Messrs. Richards, Coleman and Burchell. Mr. H. R. Weston, of the Aero Models Association, visited the club with two models, which behaved splendidly, doing some good durations. Three new members were enlisted during the afternoon, and were drafted to the Junior Section. On the 23rd the weather was excellent

for flying. The chief event of the afternoon was a record-breaking flight by Mr. Burchell's machine. This was a 4-ft. span, single-screw "pusher" monoplane, fitted with a 4-ft. hollow spar, a 12-in. propeller driven by three strands of one-eighth inch square rubber. It made a circular flight lasting 92 secs., and taking into consideration that this was about the sixth flight it had made, it was a very good performance. (The construction of the plane is worthy of mention. Instead of the ribs being nailed to the main spars as is usually the case, each one is attached by means of a small aluminium clip, which not only renders the plane light and strong, but gives the machine as a whole a very workmanlike finish. The usual hollow-spar "buses" were flown by A. Richards and E. Coleman, and Mr. Rayner's veteran Morane monoplane was also out. Another similar machine was also flown by W. Hardinge. The new junior members, R. E. Stansell, C. Burchell and C. E. Plummer were all flying neat little machines very successfully. During the afternoon several members tested the effects of intermittent explosions during the models' flight. The ordinary multiple cracker was employed, with explosions occurring every two or three seconds, but although as many as a dozen reports took place, they seemed to have little effect on the model, the latter sometimes rocking slightly laterally. The 30th was windy, and the exhibitions were not so good as usual. The usual hollow spars were out, with the addition of one each by Mr. F. E. Rayner and C. E. Plummer. During the last two months twelve new machines have made their *débuts*, and on each Saturday the club has met at Parliament Hill, where large crowds of spectators have witnessed the proceedings.

Scottish Ae. S. Model Ae. C. (5, DOUNE-QUADRANT, GLASGOW).

Monthly Report.—The annual general meeting of the club was held on September 7th in the Engineers and Shipbuilders Institute. The report was read and the financial statement, which showed a good balance on the right side, passed and approved. It was agreed to suspend all subscriptions until after the war, and that all paid for the past year be refunded. Until peace is declared it was decided to reduce the quorum from five to three members. All office bearers to stand as at present, Messrs. Arthur and Pinney to be co-opted as members of committee. Eleven members of the club have gone "On Service," nine of whom are well and fit as far as the secretary knows. The sad news of the death of one of our younger members, Mr. Geo. E. C. Hunter, on August 24th, at High Wood, from shrapnel, has just come to hand. Mr. Hunter took a great interest in model making even though he only joined us six months before war was declared. He is the first member to make the extreme sacrifice. It is with great pleasure we welcome the safe return of one of our older members, Mr. C. F. Arthur, who has been discharged.

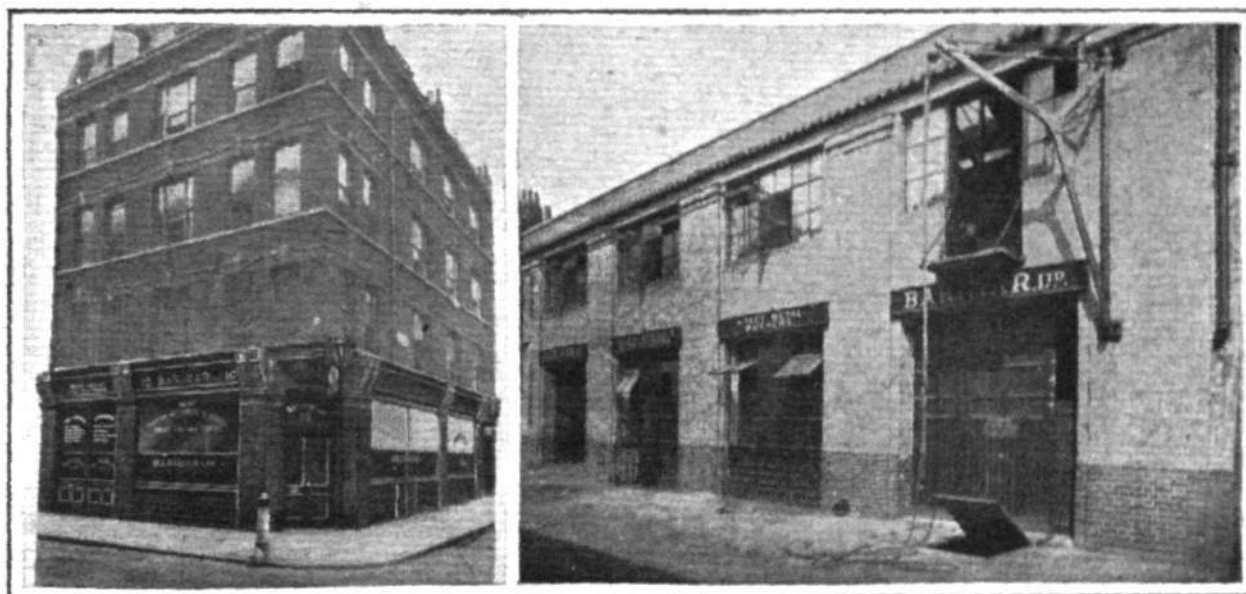
THE BARIMAR REPAIR SERVICE.

"No repair too large, no repair too small," is the motto of Messrs. Barimar, Ltd., in connection with the repair service which they offer in connection with their new works in Lamb's Conduit Street, and a walk through the shops shows that the claim is in every way a justifiable one. The works are, in fact, a hospital for motors (including aero engines), and judging from the variety of repairs which are now going through there is no conceivable accident or mishap which can happen to any part of a motor vehicle that cannot be made as good as new. Perhaps the most important department of the works is that devoted to welding. It is practically impossible to give a comprehensible summary of the range of repairs which are being successfully tackled, but a brief reference may be made to some of the hundreds of jobs. Here, for instance, is a crank chamber with large pieces torn out of the side and bottom, the result of a broken connecting-rod; when it leaves the works it will be impossible to tell that it was ever damaged. Next is a crankshaft looking as good as new, although when it arrived at the factory it was in two pieces. Not far away is a heap of induction pipes from American aero engines; the ports are being enlarged, and one or two other alterations made so as to ensure a freer

all repair work can be cleaned up and finished without recourse to outside help.

On the next floor is the sheet metal shop which is reserved for radiator and lamp repairs. Aeroplane and motor radiators—some badly smashed, others leaking or furred up—as well as several to be converted from one type to another, are lined up by the hundred for treatment, while in another department new radiators for aeroplanes and motor vehicles can be seen in the process of manufacture. Lamps have a special department to themselves, and some of the reconstructions which are carried out can only be described as wonderful, for a lamp which has to all appearance been run over can be restored so perfectly that it would be impossible to tell that it had not just been taken from the showroom. The polishing shop is equipped to polish and finish radiators and lamps, as well as to plate and burnish brass or copper fittings, and it is here that the Barimar cast aluminium number plates are polished and finished after leaving the foundry.

The success which has attended them where so many other firms have failed is largely due to the fact that Mr. C. W. Brett, the Managing-Director and General Manager of Messrs. Barimar, has from the first recognised that it is specialist



A VIEW OF THE HEADQUARTERS OF THE BARIMAR CO. IN POLAND STREET, W.—On the left, the new Barimar works in Lamb's Conduit Street. These works are a regular "hospital" for the motor industry, and almost every make of engine can be seen undergoing repair of one sort or another, while a large shop is devoted to making damaged radiators and lamps as good as new.

flow of the mixture. All sorts and sizes of cylinders—singles, in pairs, *en bloc*, air- and water-cooled—are undergoing treatment from simple cracks to the replacement of parts which have been broken away. At the present time the works are largely taken up with war work, repairing damage to parts of vehicles or motors which have come to grief in the country's service. No matter of what metal the fractured part is—aluminium, steel, bronze, copper, malleable and cast iron—Messrs. Barimar are able to satisfactorily restore it to its original use and strength. So sure is the firm of the success of their method, that they guarantee to return the amount paid if the repair does not prove satisfactory.

Adjoining the welding shop is a machine shop fully equipped with modern electrically-driven tools and appliances, so that

work and cannot be treated as a side line. The new works are admirably adapted for their purpose, all the shops receiving an abundance of natural light and ventilation. They have been planned and organised to deal in a thorough manner with every variety of repair work, and the firm have trained a band of workers who are experts in the various departments and who take a personal interest in their work. Each shop is under the charge of a foreman craftsman; while in their Works Director, Mr. H. E. Lamplough, Messrs. Barimar have not only a fully qualified engineer and organiser, but one who has every detail of motor work at his finger's ends, a very necessary gift in dealing with the thousand-and-one jobs which are sent to Messrs. Barimar to tackle, especially when it is borne in mind that in almost every case the repair was wanted "at once."



Further Prizes for Zepp. Strafers.

MR. JOHN G. MURRAY, of Thirsk, has offered £500 to airmen who bring down Zeppelins on English soil, with a limitation to the number of four.

Another Giant Zeppelin Story.

FROM Petrograd, via Copenhagen, comes the latest story of a giant Zeppelin. Four are due to be ready this month,

and it is therefore somewhat disconcerting to read that the airships will have six or seven motors, developing 15,000 h.p. It seems to be leaving it rather late to decide as to how many motors will be used. The other particulars, which are given, are: length, 780 ft.; capacity, 2,000,000 cubic ft.; load of bombs, 11,000 lbs.; range of action, 3,000 miles; altitude attainable after bombs have been dropped, 17,000 ft. They are to carry a crew of 35.

SIDE-WINDS.

DURING last week the little Beatty tractor biplane fitted with a 30 h.p. Anzani engine was taken out for trial, but in a preliminary canter the fact emerged that the centre of gravity appeared to have a very strong affinity for districts lying considerably behind the centre of lift; and so, with his usual quickness in coming to a decision, Mr. Beatty proposes to take the little Anzani out and put his own 60 h.p. engine in instead.

Which calls to mind that the reduction gear for the Beatty engine is now to hand, and will be fitted to one of the monobloc engines, probably the same that is to be fitted to the tractor biplane, a combination to be watched with interest.

CROSS-COUNTRY races have grown rather scarce these days, and it was therefore with a goodly amount of appreciation that visitors to Hendon on Saturday watched two de Havilland scouts start off side by side, and, after circling around one another for a few moments, chase one another until disappearing from view beyond the Welsh Harp.

BEYOND covering, little apparently remains to be done to the new L. and P. single-seater biplane, of which the fuselage, wings and tail planes are now finished. It will be fitted with a 50 h.p. Gnome, which is mounted between double bearers, the body being wide enough in front to accommodate the engine—that is to say, some 3 ft. wide. After being used to machines where the pilot's cockpit is so small that he practically has to be pushed into it by the aid of a shoe-horn, this body looks immense in width, and certainly affords the pilot plenty of elbow room.

THE new flying school at Cheltenham is now, we understand, in full swing, a start being made on Sunday last. No end of trouble has been taken to ensure that the ground is in as good a condition as it is possible to get it. In some places the turf has been raised considerably to equalise inequalities. The result is a beautifully level stretch for rolling and landing, on which even the novice finds no difficulty in alighting safely, so that he is pleased; while on the other hand the smooth surface may be expected to very materially reduce the amount of smashes, thus saving the proprietors of the machines a goodly percentage of repair bills, giving a good return for the initial outlay on levelling the ground.

THE Cambridge Flying School has arrived at a stage of its development where all the capital required is in hand, and the registration has been duly attended to, so it would appear as if a start should soon be made here also.

GENERALLY speaking, things were very quiet at Hendon last week-end, a number of the firms being shut down for the holidays. At the Grahame-White end of the aerodrome all the hands were away with the exception of a small gang hard at it moving the last of the machinery across to the new works on the other side of the old footpath, so as to have everything ready for a start in the new premises on the Monday.

FROM the 1st of January next the handling of "Shell" spirit will be taken over by the Shell Marketing Co., Ltd. In the notice of the change it is pointed out that by this new arrangement the Shell Marketing Co., Ltd., will enjoy all the advantages of the vast resources of the parent companies, with their own fields of production and refineries practically encircling the earth, their extensive fleet of tank steamers, their great financial strength and almost unlimited resources. The significance of this great strength of the source of supply will be readily appreciated by commercial users of motor spirit, who realise that—particularly under war conditions, when they are compelled to rely upon themselves rather than upon the railways—they need the utmost protection for the motor traction which they have brought into use for the delivery of their goods, and they are now making their arrangements with the Shell Marketing Co. to ensure their 1917 supplies of motor spirit.

All that the parent companies' unparalleled experience has taught them in the direction of service efficiency has been brought into the organisation of the new concern. The company's 500 motor spirit depôts now form a network amply covering the entire kingdom. The motor delivery fleet has been considerably augmented. Excellently-appointed divi-

sional offices have been established in all the great centres. All of which is real good hearing for users of Shell motor spirit.

A very satisfactory item in connection with the new company is that Mr. J. Cates, who is so well known in Shell matters, will be associated with the important work of the new company.

FROM PANELS TO PROPS.

It has often been remarked what a number and variety of firms have been drawn into the aviation industry during the war, not only firms who were doing work requiring comparatively few alterations to already existing plants for the successful production of component parts of aeroplanes or complete machines, but also firms whose previous business had, one would think, nothing in common with aircraft construction. In the former class must be reckoned Messrs. Aldam, Heaton and Co., Ltd., the well-known ships' decorators and furnishers, who have works in Agincourt Road and in Parkhill Road, Hampstead, and whose head offices are at 156, New Bond Street. Before the war this firm were engaged on making panels, wood carvings and furniture for passenger liners, having equipped among others the "Olympic," the "Britannic" and other White Star liners. This class of work necessarily required the most thorough knowledge of woodworking, including careful seasoning to avoid warping, &c., and it is therefore not surprising that the firm, once having taken up various kinds of woodwork in connection with aeroplanes, have proved more than equal to the task. They are at present engaged chiefly on the construction of four-bladed air screws, of which they are turning out large quantities, and the workmanship and general finish of these are beyond reproach. The number of rejections have, we understand, been surprisingly small, as the utmost care is taken during the whole process of construction to ensure perfection.

Adjoining the old premises are some that have hitherto been employed by another firm. Owing to the pressure of their work these have now been acquired, affording very considerable extensions, and when in readiness they will enable the firm to turn out a considerably larger quantity not only of propellers, but also of other aeroplane parts. A large stock of different timbers is already at hand awaiting the time when the new premises shall be ready, and judging by the results obtained in the manufacture of propellers there is every reason to suppose that the construction of other aeroplane parts will meet with equal success.

NEW COMPANY REGISTERED.

ALLIES FLYING SCHOOLS, LTD.—Capital £3,000 in 2,500 ordinary shares of £1 each and 10,000 deferred shares of 1s. each. Objects, to carry on schools for teaching the science or art of aerial navigation, &c. G. H. Bettinson is first managing director.

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